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ALLERGY IN OTORHINOLARYNGOLOGY AND OPHTHALMOLOGY. A REVIEW OF THE RECENT CURRENT LITERATURE.

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A review of the literature on the subject of allergy from the standpoints of ophthalmology and otolaryngology for the year 1940 reveals an increasing interest and more attention to this phase of the above specialties. In several articles, especial emphasis has been placed upon the importance of recognizing the atypical or subclinical types of nasal allergy, such as those which are characterized symptomatically by nasal obstruction and postnasal discharge. In these cases there may be a complete absence of sneezing and anterior discharge. The nasal mucosa may be normal in appearance, slightly red or slightly pale. The mucosa appears boggy and the breathing space through the nose is limited. These patients are often subjected to submucous resection without relief. Local cautery or the use of escharotics may produce temporary improvement. There may be an accompanying stuffiness in the ears from Eustachian tube involvement. The lower respiratory tract may also be involved, but manifested only by cough or a sense of limitation of free respiration and yet there may be no evidence of definite bronchial asthma.

The examination of the nasal and, in some cases, the bronchial secretions, shows a low grade eosinophilia. Several examinations of the secretions may be necessary before a diagnostic eosinophilia can be demonstrated. On the other hand, the clinical picture of allergy may be temporarily obscured by an acute cold, and occasional chronic infection may be superimposed.

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In many papers on the subject of sinusitis, allergy is not given due consideration as an accompanying factor. Cases of pure allergy may be designated as sinusitis. The relationship of complicating infection to allergy must be carefully evaluated on the basis of bacteriologic and cytologic studies. Acute, subacute and chronic infection must be distinguished.

PHYSIOLOGY.

In a series of experiments on the aspiration of coal dust, Van Dishoeck¹ noted that the mixing of air inspired through both nostrils is perfect before it reaches the trachea, granted that both sides of the nose are of equal calibre. When, however, one side of the nose is narrow and the other is wide, the weak current of the narrow side will be carried along laterally in the strong current of the wide side and will not mix well. In such a case the current will sweep air from the narrow side of the nose to the lung of the same side and not into the other lung. He does not believe that the same thing takes place when mucopus is under consideration in cases of one-sided sinusal infection, because the air current from the stenosed side of the nose is too weak to carry along the sticky mucopus. This can also be shown by having a patient with a one-sided sinusal infection forcibly exhale from that side of the nose through a tube having the same pattern as the nose, pharynx and trachea. If a glass slide is held at the end of the tube it is noted that on normal and forced expiration, droplets are not carried off with the air stream. From these experiments, Van Dishoeck concluded that pulmonary infection by means of aspiratory drops in cases of nasal infection is of little consequence, and that the chance of infection of the lung on the same side is slight.

ALLERGY OF THE PAROTID AND SUBMAXILLARY GLANDS.

It has been suggested by Rowe² that allergic involvement may occur in any of the endocrine or secretory glands. On several occasions we have noted the occurrence or the history of occurrence of unilateral or bilateral swellings of the parotid glands in association with other manifestations of allergy, especially angioneurotic edema and urticaria. Rowe has also noted involvement of the submaxillary gland. In our observations, however, we did not recognize the parotid symptoms

as the result of allergic involvement until recently, when a patient presented bilateral parotid swelling in association with angioneurotic edema and urticaria. A mucous plug expressed from Stenson's duct revealed a large number of eosinophiles and no neutrophiles. In another case, a patient with nasal allergy, associated with Eustachian tube involvement and deafness, presented recurring swellings of the right parotid gland. Eosinophiles were noted in the parotid secretion.

It is interesting that the demonstration of eosinophiles and also Charcot-Leyden crystals in the parotid secretion were demonstrated by Kussmaul² in 1879. In his patient, a plug of thick secretion was expressed from the duct, and following this there was a gush of clear secretion. In order to demonstrate eosinophiles in the parotid secretion, an effort should be made to obtain a mucous plug, for the watery secretion may contain very few cells, because of their high dilution. This is also true of watery nasal secretion. A case similar to that of Kussmaul was reported by Ipscher,³ in which the involvement occurred in the submaxillary gland. Von Reuss⁴ noted the occurrence of parotid swellings with the menses in a patient who also showed a blood eosinophilia. Parotid swellings associated with attacks of abdominal colic have also been reported. Londe and Pelz⁵ noted the appearance of a unilateral swelling of the parotid associated with abdominal colic. These were undoubtedly cases of food allergy.

A most comprehensive report on this subject has been presented recently by Pearson.⁶ His observations were based upon the study of 17 cases, in 11 of which there was no evidence of secondary infection. In the group of 11 cases, seven were children under 12 years of age. There were seven males and four females.

According to Pearson, the swelling may affect one or both parotid or submaxillary glands. The swelling usually develops quickly and is often associated with the ingestion of food. Pain and tenderness may be absent. The saliva is usually clear and sometimes there is little or none. Among the 11 patients observed, bilateral swellings occurred in seven.

The condition of the gland ducts was studied by an X-ray examination following the injection of 3 to 6 cc. of lipiodol.

In five instances there were small dilatations of the terminal ducts or acini. One patient showed a gross dilatation of the main duct and its branches. In one patient the findings were normal. Pearson suggests that obstruction of the ducts may be the result of spasm or an edema of the lining membrane, occurring as a part of an angioneurotic edema of the whole gland. In those instances in which there was no increase in parotid secretion it is reasonable to assume that the swelling was the result of angioneurotic edema.

In several cases there was a definite blood eosinophilia. In one patient a very marked eosinophilia was demonstrated in the parotid secretion. Among the 11 patients, the association of the following manifestations of allergy was noted: asthma, four; papular urticaria, two; hay fever, three; nasal allergy, one; angioneurotic edema and urticaria, one; and eczema, one. Five patients gave a positive family history, and nine both a positive family and personal history of allergy.

In addition to the above 11 cases, Pearson added a group of six cases in which there was evidence of secondary infection. Three of the patients had papular urticaria. One was sensitive to pork, which also caused vomiting. Three patients gave a family history of allergy. In one instance both eosinophiles and neutrophiles were noted in the parotid secretion.

DIAGNOSIS AND TREATMENT OF RESPIRATORY ALLERGY.

Halpin⁷ reviews his studies of 283 consecutive cases of respiratory allergy seen in private office practice from July, 1937, to December, 1938. They were classified as follows: seasonal hay fever, 71; seasonal bronchial asthma, 66; perennial nasal allergy, 94; and perennial bronchial asthma, 52. Adequate allergic investigation was completed in 274 cases. Encouraging results were secured in the majority of the patients. The importance of a thorough allergic investigation to determine the etiologic factors is emphasized.

Lillie⁸ emphasizes the importance of considering collapse of the alae of the nose as the cause of nasal obstruction, and he feels that this condition is more frequently present than is generally believed. If a cotton ball tucked into the anterior superior recess of the vestibule gives complete relief of obstruction, the diagnosis is established. Some patients,

when the cause of obstruction is pointed out, will be able to correct the condition by correcting the air breathing. In some cases the cotton ball may be used; in others, a silver tube shaped to fit the vestibule. If other methods do not suffice, surgical procedures may be tried. It is important to take this point into consideration in patients with nasal obstruction, particularly in differentiating nasal obstruction due to allergic swelling of the mucosa and mechanical obstruction as described above.

Oppegaard⁹ believes that every case of nasal obstruction, either acute or chronic, should be considered as of possible allergic origin until proved otherwise. It is pointed out that often the patient who has a marked deflection of the septum may not complain of nasal obstruction. Oppegaard states that in his experience 30 per cent of the nasal cases present local finding attributable to allergy or are associated with other manifestations of it. Emphasis is also placed upon the importance of recognizing allergy as the cause of nasal obstruction in children. Allergy, he states, explains many poor results obtained from removal of the tonsils and adenoids in children.

Fox, Harned and Peluse¹⁰ call attention to certain types of borderline allergy of the upper respiratory tract and their relation to hyperplastic changes in tissues in these structures. They point out that the difficulties in proper evaluation of the symptoms and pathologic changes of hyperplastic disease of the respiratory tract result in the classification of these borderline conditions under diseases in no way related to allergy. They further state that neither the texture nor the color of the tissues nor the character of the exudate gives any hint of the allergic nature of the borderline condition, since pallor, edema and eosinophilia are not always present. They base the diagnosis of borderline allergy upon the finding of gross hyperplastic changes in a person with a history of allergy or in whose family there is a history of allergy and in whom a foreign protein study reveals positive sensitivity to particular allergens. Among the various hyperplastic conditions are listed: chronic intermittent nasal obstruction; chronic lymphoid pharyngitis, frequent colds; recurrent acute laryngitis, pachydermia laryngis, singers' nodes, and papillomas; chronic purulent discharge and tubal-tympanic catarrh.

Our observations are in agreement with those of Fox and his coworkers, in that cases of borderline or subclinical allergy, particularly of the nose and sinuses, are frequently overlooked because of the lack of the typical edematous changes and because of the vagueness of the symptoms. We have encountered a definite group of cases in which stuffiness and sometimes dryness of the mucosa with postnasal discharge are the predominating symptoms. Often there is little or no sneezing. Eosinophiles are almost always present but are difficult to demonstrate because of the scanty amount of secretion available for observation. Repeated cytologic observations are, therefore, necessary before the diagnostic eosinophilia can be demonstrated. These patients are often subjected to submucous resection or cauterization of the turbinates without relief. Most of the cases of this type are caused by inhalants, particularly house dust. The symptoms are usually more pronounced in the winter than in the summer. Cases of this type are sufficiently common to warrant careful consideration from the rhinologic standpoint. With proper allergic management, most satisfactory results should be obtained.

Lathrope, Peer and Paddock¹¹ state that in latent sinusitis there are few local symptoms, yet the hyperplastic mucous membrane can readily be demonstrated by the use of contrast mediums. They further state that, although the irrigation fluid may fail to reveal bacteria, they may still be present in the deeper layers of the thickened membrane, their toxic products being continually absorbed, causing constitutional symptoms. In a series of 100 cases of chronic disease of the antrum, suppurative in 50 and hyperplastic in 49, the chief subjective symptoms were: lassitude, 82; repeated colds, 63; rheumatic pains, 50; cough, 36; indigestion, 33; loss of weight, 23; asthma, 14; and hay fever, eight. It is very probable that in the 22 cases of hay fever and asthma, the pathologic changes in the sinus were primarily of allergic origin. It is also very probable that in those cases with repeated colds there were also a significant number with nasal allergy. Allergy, as such, was not considered as an important factor in the 100 cases of chronic disease.

Podvinec¹² has shown that nasal polyps usually arise from locations in the lateral nasal wall where there is duplication

of the mucous membrane, such as the lips of the hiatus semilunaris, the maxillary ostium and the ostium of the individual ethmoid cells. Numerous drawings demonstrate the acute angle formed by the margins where the mucosa lies in two layers, back to back. These sites or predilections for the development of polyps were described by Zuckerkandl more than 50 years ago. Histologically, the mucosa in the region of the ostia of the various sinuses is comparatively thinner and much more delicate than that of other parts of the nasal cavities. As a matter of fact, the tissue in these areas has a loose, myxomatous-like stroma which readily undergoes extensive edema with resultant polypoid formation. The polyps are very rare on the septal surface of the middle turbinate, the inferior turbinate or the septum, and when they do occur in these areas they are usually papillomatous and not the true edematous type of polyp.

Scholz¹³ discusses the part played by polyps in sinusitis, and he believes that they are usually of allergic origin. He advises radical surgical interference. When satisfactory results are not obtained, he advises detailed study of nasal secretions and blood smears for eosinophilia and allergic study. He advises such nonspecific treatment as the use of splenic extract and the administration of calcium and phosphorus. He also recommends cauterization of the turbinates with trichloracetic acid. These observations are characteristic of the general prevailing attitude of rhinologists on the management of cases of polyposis, in that surgical procedures should be instituted first. We have found that far better results are found by instituting allergic management first, and then performing whatever surgical procedures are necessary, usually employing the more conservative types of operations.

In a general discussion of the subject of the diagnosis and treatment of chronic disease of the paranasal sinuses presented by Williams and Mousel,¹⁴ they state that the fundamental requirement in the treatment of chronic sinusitis is a differential diagnosis accurate enough to prevent the application of formidable surgical procedures to conditions in which they cannot logically be expected to produce any beneficial effect. They further state that it is lack of attention to this important detail that has had the effect of bringing surgical

procedures directed against chronic suppuration in the paranasal sinuses into disrepute among the uninformed physicians and laymen, not, however, without justification. A great deal of emphasis is placed upon the importance of the diagnosis of allergy and allergy with infection in relation to chronic disease of the paranasal sinuses. The value of cytologic and bacteriologic examination and their correlation with the symptomatology, X-ray and physical findings is discussed in considerable detail. The indications and techniques of various surgical procedures on all the paranasal sinuses are outlined. It is finally concluded that as far as surgical interference is concerned, an operative technique which logically fits the individual case and which will be adequate to take care of the disease present should be selected.

ALLERGY AND SINUSITIS IN CHILDREN.

In discussing the matter of sinusitis in children, Beck and Fabricant¹⁵ emphasize the importance of recognizing allergy as the possible cause of sinus disease, and its differentiation from pure sinus infections.

In an analysis of 455 cases studied in the Pediatric Allergy Clinic by Hansel,¹⁶ the incidence of various types of respiratory allergy was tabulated. It is noteworthy that the incidence of pure nasal allergy was only about 15 per cent, but this could be accounted for by the fact that diagnosis was frequently missed in cases of this type. It was pointed out that many patients were subjected to tonsillectomy for relief of colds and bronchitis who had respiratory allergy and not infection. A new technique of staining nasal and bronchial secretion which requires only about one to one and one-half minutes is described. A great deal of space is devoted to the matter of the interpretation of cytologic pictures. A number of case reports are presented illustrating the value of cytologic studies in diagnosis and in determining the clinical course of respiratory allergy in its relation to complicating infection.

In the conservative treatment of sinusitis in children, Gewanter¹⁷ emphasizes primarily establishment of an accurate diagnosis. He places a great deal of emphasis upon the occurrence of frequent colds. The commonest complaints of

his patients were: 1. frequent colds; 2. nasal obstruction and discharge; 3. some degree of low grade fever; and 4. cough. He calls attention to the importance of differentiating allergic complications. He uses the displacement type of therapy, employing 0.5 per cent solution of ephedrine sulphate in physiologic saline solution or a 0.125 per cent solution of neosynephrine. By this method of treatment he reports early and satisfactory relief to children suffering from nasal sinus infections and cough.

In discussing the matter of sinusitis in children, Kerley¹⁸ emphasizes recognition of the allergic type. This type of sinusitis, he states, is characterized by frequent so-called colds and perennial nasal discharge with edema of the nasal mucosa and swelling of the turbinates. Upon Roentgen examination of the sinuses, he noted an opacity or edema of the mucous membrane of the antrums, recorded as 3 or 4+. He recommends that all children presenting this syndrome be given skin tests with pollens and the usual air-borne allergens, including house dust, orris root, feathers and various animal hairs. He further states that nonallergic sinusitis is more frequent than the allergic type. No statement is made, however, as to the differentiation of allergic and infectious sinusitis on a cytologic basis.

In discussing the general subject of the upper respiratory revenge of the allergic child, Tumpeer¹⁹ states that in allergy, sinus involvement is an effect rather than a cause, and sneezing is not characteristic of sinusitis. He also points out that the narrow nasal passage is due to edema of the mucosa rather than to a structural bone defect. The point is also emphasized that tonsillectomy and adenoidectomy *per se* have no therapeutic benefit in asthma, and that there is no excuse for tonsillectomy on the grounds that fewer colds will result, therefore fewer attacks of asthma. Finally, it is emphasized that surgical procedures of all types should be deferred until complete allergic study has been carried out.

X-RAY DIAGNOSIS.

In using iodized oil as an opaque medium in X-rays of the sinuses, Grove²⁰ states that because of the density of the shadows produced, small polypoid changes or membranous thick-

ening are often not visible in certain portions of the antra. He, therefore, suggests the use of colloidal thorium dioxide solution, which is also designated as umbrathor. Umbrathor is a colloidal solution containing 25 per cent thorium dioxide. Following its use in 75 allergic cases there has been no untoward reaction. Its use has been more satisfactory than iodized oil because no instances of sensitivity were observed. Because it is in aqueous form, it may be injected easily in diluted strengths and is, therefore, inexpensive. It gives a clear, delicate delineation of slight polypoid changes which are often obscured by iodized oil. It is nonirritating and non-toxic. Grove states that in 75 antra injected with this solution the findings were confirmed in 30 per cent of the cases by the Caldwell-Luc operation.

Thienpont²¹ emphasizes the fact that allergy influences the interpretation of Roentgen films. Whenever the routine Roentgen and clinical examination are inconclusive, he advises further studies with iodized poppyseed oil, plus a determination of the emptying time. He found that ciliary activity in the sinuses remains almost normal despite extensive polyposis of allergic origin, whereas it is markedly impeded if the pathological condition is truly infective.

Johnson²² reports the results of an analysis of 854 successive Roentgen examinations of the sinuses in cases in which the clinical records were complete. The comparison of the Roentgen with the clinical diagnosis shows a close parallel, the former being positive in 632 cases, and the latter in 614. The agreement between the two was positive in 539 and negative in 140, a total of 679, or 80 per cent of the entire group. Pathologic changes were found in 131 of 133 cases subjected to surgical interference. The clinical and Roentgen diagnoses were in agreement in 128 of these. An analysis of the findings in 163 sinuses which were operated upon and in which simple clouding was reported in preoperative Roentgen study revealed that the most frequent findings were pus in 63, and pus and thickened membrane in 67. In 37 sinuses operated upon, showing thickened membrane by the X-ray, there was pus in 13, and pus and thickened membrane in 15. There is no correlation of allergic studies to determine the possible incidence of allergy among those cases in which thickened membranes were found.

BRONCHOPULMONARY CONDITIONS.

According to the observations of Miller and Piness,²³ administration of potassium therapy gave no relief in 38 of 40 hay fever patients. The remaining two patients received as good relief from placebos.

A clinical evaluation of the use of potassium salts in the treatment of pollinosis was reported by Rubin, Aaronson, Kaplan and Feinberg.²⁴ They concluded that potassium salts were of no practical therapeutic value in a study of 153 patients with hay fever and seasonal asthma. The effect of such salts in other allergic conditions, they state, is highly questionable. It was emphasized that the results of such therapy in hay fever should be received with skepticism unless they are evaluated by methods based on the relationship of the symptoms to daily, seasonal and geographic fluctuations of the pollen counts.

In a study of the results of potassium therapy, Rusk, Dean and Rindskopf²⁵ found that among 55 patients with a nasal allergy, there is no variation in the blood potassium from the normal. Of 35 patients suffering with ragweed hay fever who received potassium therapy, only 9 per cent obtained marked relief; 67 per cent were not improved. They found, however, that in the treatment of other types of nasal allergy, potassium salts were very effective.

In a clinical study of the use of potassium chloride in allergic disorders, Harsh and Donovan²⁶ have shown on the basis of their studies that the divergent results obtained by such therapy by different workers failed to reveal any definite reason for the variation of different results. From their clinical study of 40 patients with miscellaneous forms of allergy who were treated with potassium chloride, negative or questionable results were obtained in all but one case. The serum sodium was determined before and after the medication in 18 of these patients. In 15 of these, the serum potassium was also determined. No significant variation in the concentration of either ion was found.

The question of the value of Roentgen therapy for sinusitis is presented by Gatewood,²⁷ whose observations are based upon a study of 22 cases of chronic sinusitis. He feels that Roentgen therapy for any form of sinusitis is in its earliest

experimental stage. The 22 patients were examined Roentgenologically and rhinologically before and after receiving therapy, with no definite evidence of uniform improvement of the infection despite Roentgenologic changes. It is further stated that, with the exception of a single case, microscopic examination of the polypoid content of eight antra which had been subjected to Roentgen therapy did not show any obvious difference from similar pathologic content of other antra which had not received like treatment.

Gundrum²⁸ reports his observations on a group of 800 patients with sinusitis treated by the displacement method, using ephedrine, neosynephrine, bacterial antigens and foreign proteins. By means of X-ray plates he has shown that allergic edema of the sinuses may be transitory. He emphasizes the importance of differentiating infectious sinusitis and allergy, and the recognition of possible combinations of these two diseases. They found that the displacement treatment with ephedrine or neosynephrine gave good results, but was much better if bacterial antigens were added. Among the 800 patients studied, the percentage of improvement with various medicants was as follows: *a.* foreign proteins, 25 per cent; *b.* ephedrine and neosynephrine, 58 per cent; *c.* bacterial antigens, 71 per cent. Upon rechecking 100 patients by examinations and questionnaires from two to six years after they were discharged, they report that the results appear to be permanent in most cases.

Walsh²⁹ reports his extensive observations on the use of intranasal vaccine spray as prophylaxis against the common cold. He points out that the prophylaxis of colds by the use of subcutaneous injections of vaccines has proved to be disappointing. He presents experimental evidence to show that the rational method of vaccination against the common cold is by the local application of vaccines to the nasal mucosa. The results are tabulated in the treatment of 384 patients over a period of eight years. Of a total of 627 patient-years of vaccination, there were 74 per cent good results, 10 per cent fair results, and 16 per cent failures. Control experiments were conducted on 144 patients. It is finally suggested that the results warrant the conclusion that the method of local vaccination against the common cold offers the best method of prophylaxis at our disposal.

Thacker²⁰ reports his results in the treatment of chronic obstructive rhinitis with submucosal injections of sodium psylliate. One-fourth to one-half cc. of 5 per cent sodium psylliate is injected into the inferior turbinate on one side at a sitting. He states that in chronic rhinitis in which the mucosa fails to shrink well with cocaine, adrenalin or ephedrine, treatment with sclerosing agents is not indicated. This method of treatment is recommended in the treatment of nasal allergy which has not responded to allergic management. He reports the complete relief or improvement of nasal obstruction in 24 patients treated by this method. The number of injections necessary to produce the desired effect ranged from one to four in the same turbinate, with an average of two injections being sufficient in the majority of instances.

EDEMA OF THE LARYNX.

The subject of edema of the larynx, with a study of the loose areolar tissue, is presented in a very interesting manner by Miller.²¹ This presentation considers the history of previous observations, the physiologic nature of edema, the symptoms caused and the treatment. The subject of angioneurotic edema of the larynx is discussed in considerable detail. In the treatment of these cases, the hypodermic administration of 1:1,000 epinephrine and the local application of 1:100 epinephrine are suggested. Scarification and application of medication by means of swabs are unwise. The patient should be constantly watched, and facilities should always be on hand for quick tracheotomy. The mechanism of edema of the larynx was studied by means of experiments on the cadaver. From these observations it was concluded that a dense and fibrous band holds down the mucosa along the midline over the cricoid cartilage on its esophageal surface, running in a vertical direction. Submucous areolar tissue on the base of the tongue extends upward as high as the tip of the epiglottis. Attention was called to the fact that certain types of edematous fluid may spread more rapidly than others because the protein content affects the diffusibility. Various factors such as these make it difficult to evaluate clearly the clinical importance of these particular findings. Localized edema is known to occur, however, in various parts

of the larynx in areas which might be limited by the barriers described.

Frank³² reports a very interesting case of angioneurotic edema of the larynx due to sensitivity to chicle. He calls attention to the fact that in differentiating the angioneurotic from other types of laryngeal edema, the former, or the allergic edema, is usually associated with other manifestations of allergy, such as urticaria or angioneurotic edema of the skin, nasal allergy or gastrointestinal allergy. In the examination of the larynx, he states that angioneurotic edema does not appear as if a puncture would liberate water. It appears firmer in consistency. He calls attention to the report of Jackson, who pointed out that 33 per cent of the patients who have died from angioneurotic edema of the larynx had a fatal termination because of the want of prompt tracheotomy.

The case reported by Frank was a man age 22 years, who, five minutes after the ingestion of chewing gum, noted a lumpy choking feeling in his throat, together with a sensation of dryness and nausea, which prompted him to expel the gum immediately. Soon afterwards, his face and extremities began to swell and he felt itchy. There was a watery discharge from the nose, associated with sneezing. Within an hour he developed nausea and vomiting. Examination of the patient showed a generalized giant urticaria, suffusion of the conjunctiva with lacrimation, coryza, syncope and vomiting. A nasal examination showed a typical allergic membrane. The larynx presented a moderate to marked edema of both arytenoids and aryepiglottic folds, as well as slight edema of the epiglottis. The glottic space was definitely narrowed but not sufficiently to cause any dyspnea. Following the injection of 10 minims of adrenalin, the patient began to show improvement. Within two hours after the onset of the attack, the larynx was entirely normal. In three and one-half hours after the onset there was little remaining evidence of the generalized edema and giant urticaria. Intracutaneous tests showed marked reactions to several inhalants and foods. Intracutaneous tests using an extract of chicle showed very pronounced reactions. Serum was obtained from the patient for passive transfer, which was administered to five normal subjects. One of the subjects gave a definitely positive reaction to the transfer test on the area of skin sensitized to the solution containing 0.015 mg. N. per cc.

BRONCHOPULMONARY CONDITION.

Bozer³³ states that the bronchoscopic observation of the collapse of a main bronchus without any evidence of external pressure is apparently very uncommon, as he has failed to find a report of such observations during the last 20 years. He reports in detail the observations made in three patients. Dyspnea was one of the outstanding symptoms. One of the patients had asthma. In two of the patients the obstruction of the main bronchus was complete. Diagnosis was established by bronchoscopic vision, so the nature of the obstruction was unquestionable. It is suggested that the reason for the collapse was either the occurrence of an exceedingly strong spasm of the bronchial musculature or the presence of structural weakness in the walls of the bronchus.

The subject of mycotic infection of the bronchopulmonary tract is considered in great detail in the presentation by Vadala.³⁴ He emphasizes the importance of bronchoscopic examination, aspiration and culture of the bronchial secretions. In these cases, differential diagnosis lies between chronic bronchitis, pulmonary tuberculosis, asthma and bronchiectasis. A number of case reports are presented to emphasize the value of bronchoscopic methods in diagnosis and treatment.

According to the observations of Prickman and Moersch,³⁵ they noted that among 140 patients suffering from asthma, examined with a bronchoscope, 60 were found to have definite stenosis of one or more bronchi. They state that bronchostenosis is primarily inflammatory and not referable to allergic edema or bronchial spasm. A study of these patients showed that bronchostenosis complicating asthma generally produces characteristic symptoms and frequent physical and X-ray signs. One prominent symptom is severe, persistent and sometimes paroxysmal cough. At first it is impossible for the patient to raise sputum, and when it appears it is profuse, usually mucopurulent, and is sometimes streaked with blood. Febrile episodes, either with or without preceding chills, occurred in 68 per cent of the cases. Of the 60 patients, 53 per cent gave a history of pneumonia; 35 per cent of pleurisy. After the acute phase subsides, bronchoscopic examination reveals a stenosed bronchus, and dilatation by forceps

introduced through the bronchoscope, and aspiration of the retained secretion usually relieves it. Other physical signs are secondary to the atelectasis. They state that almost every case of bronchostenosis complicating asthma may be traced to an acute infection of the respiratory tract.

OCULAR ALLERGY.

Thomas and Warren³⁶ present an analysis of 30 consecutive cases of allergic conjunctivitis. Results of skin tests concurred with the history of inhalant factors responsible for the eye symptoms in 14 cases. Only six of the 30 patients, or 20 per cent, had no related allergic manifestations. Satisfactory results were obtained in more than 50 per cent under allergic management. This group of cases was not selected but consisted of 30 consecutive cases of allergic conjunctivitis with no exceptions.

In discussing the matter of allergic conjunctivitis, Bowen³⁷ classifies this disease into two types, the vernal and the non-vernal. He believes that vernal conjunctivitis is a form of contact dermatitis, and its treatment is expedited by using both the water and the fat soluble antigens. He feels that the nonvernal type may be the result of cosmetics, drugs, bacteria, foods, environment, pollen and fungi. Close co-operation between the ophthalmologist and the allergist is recommended. In the practical management of these cases it is suggested that the physician personally visit the patient's home and place of employment.

Lerhfeld and Breisacher³⁸ report a case of trichinosis presenting chemosis of the bulbar conjunctiva. In view of a possible similarity of bulbar chemosis of this type and allergic reactions, it is important to differentiate the two conditions. The patient had an eosinophilia of about 25 per cent. Sections of biopsies taken from the gastrocnemius muscle showed well developed cysts including the three-stage larvae of *Trichinella spiralis*. Examination of the eyes showed the lower bulbar conjunctiva to be intensely chemotic, so marked that it protruded between the lids. The conjunctival vessels were slightly injected and the entire conjunctiva had a yellowish, waxy appearance.

In experimental studies of the species specificity of proteins of the optic lens, Markin and Kyes³⁹ found that the

extreme specialization of the optic lens results in a tissue whose constituent proteins are the same in two mammalian species as widely separated as dog and beef, and are, therefore, in full accord with the results obtained with the precipitation tests by Ublenhuth, Hektoen and others. Markin and Kyes further observed that the autosensitization to lens proteins induced in the guinea pig is not noted in the pigeon.

Beetham⁴⁰ states that allergic cataract may be unilateral, as well as bilateral. In 30 to 50 per cent of the cases, involvement is unilateral. Ten cases are described in detail. On two occasions, intradermal tests with aspirated aqueous gave negative reactions. In two cases, histologic examination of the crystalline lens showed cortical degeneration and normal capsule. It is noteworthy that all the patients had an active long-standing eczema; two also had asthma. Seven of the patients were in the third decade. One patient was 40 years of age, and two were 4 and 16 years, respectively. Five were males and five females. The possible part played by infection, avitaminosis, deficiency of the endocrine glands and a disturbance of the autonomic nervous system were discussed. In the opinion of Beetham, allergy appears to be the most important etiologic factor.

ALLERGY AND THE EAR.

Skoog⁴¹ reports his experimental observations on the production of a vestibular syndrome, produced by making centripetal intracarotid injections of sheep-hemolytic rabbit serum into a large number of guinea pigs. The investigation was carried out with the idea of locating the site of allergic reaction. The symptoms which followed intracarotid centripetal injection on the right were characterized by certain vestibular phenomena: twisting of the head and the whole body to the left, and circus movement to the left, as well as constant ocular deviations and disturbances of the normal caloric and rotatory reactions. The symptoms were regarded as vestibular phenomena of irritation produced by disturbances in the vestibular ganglions of the medulla oblongata, for preliminary removal of the peripheral labyrinths and the cerebellum had no influence on the character of the symptom complex. Histopathologic examination showed an increased capillary permeability in the medullopontile region with hem-

orrhages. These changes were verified by intravital staining with acid dyes, with which an intense staining of this region can be observed. Although the results noted were not considered directly applicable to man, they should, no doubt, be of interest regarding the allergic genesis of certain forms of Ménière's disease.

Criep⁴² discusses the subject of vertigo of allergic origin, stating that it is caused by edema of the various structures of the internal ear. The symptoms produced depend upon the particular structures involved. The most common complaints listed were tinnitus, deafness and gastric disturbances. The deafness is usually of a transitory nature. The differential diagnosis is based upon family history of allergy, personal history of allergy, blood eosinophilia, skin tests, response to adrenalin and the absence of other etiological factors. Allergic management with particular attention to the diet is often beneficial.

REFERENCES.

1. VAN DISHOCK, H. A. E.: The Course of Inspired Air and the Possibility of Aspiration of Mucopus from One Side of the Nose into the Corresponding Lung. *Acta Otolaryngol.*, 27:414, 1939.
2. ROWE, A. H.: Clinical Allergy Due to Foods, Inhalants, Contactants, Fungi, Bacteria and Other Causes, p. 531. Lea and Febiger, Philadelphia, 1937.
3. KUSSMAUL: Loc. cit., Ipscher, *Berlin Klin. Wchnschr.*, 36:541, 1879.
4. VON REUSS, A.: *Jahrb. f. Kinderh.*, 70:161, 1909.
5. LONDE, S., and PELZ, M. D.: *Jour. Pediat.*, 2:594, 1933.
6. PEARSON, R. S. B.: Recurrent Swelling of the Parotid Glands. *Arch. Dis. Child.*, 10:363, 1935.
7. HALPIN, L. J.: Respiratory Allergy; Survey of 283 Consecutive Cases Seen in Office Practice from July, 1937, to December, 1938. *Jour. Iowa Med. Soc.*, 29:439, 1939.
8. LILLIE, H. I., and KINSLEY, S. M.: Nasal Obstruction Caused by Collapse of the Nasal Alae. *Ann. Otol., Rhinol. and Laryngol.*, 48:600, 1939.
9. OPPEGAARD, C. L.: Nasal Obstruction: Is It Allergic? *Minn. Med.*, 23:112, 1940.
10. FOX, N.; HARNED, J. W., and PELUSE, S.: Borderline Allergy. Its Relation to Hyperplastic Disease of the Respiratory Tract. *Arch. Otolaryngol.*, 31:502, 1940.
11. LATHROPE, G. H.; PEEK, L. A., and PADDOCK, R.: The Importance to the Internist of Latent Paranasal Sinusitis. *Ann. Int. Med.*, 12:1576, 1939.
12. PODVINEC, S.: Les relations entre les polypes du nez et les affections des cavités paranasales. *Ann. d'oto-laryngol.*, p. 266, March, 1939.
13. SCHOLZ, W.: Sinusitis in Allergic Persons. *Ztschr. f. Hals-, Nasen- u. Ohrenheilk.*, 45:14, 1939.

14. WILLIAMS, H. L., and MOUSEL, L. H.: Diagnosis and Treatment of Chronic Disease of the Paranasal Sinuses. *Ann. Otol., Rhinol. and Laryngol.*, 49:466, 1940.
15. BECK, J. C., and FABRICANT, N. D.: Sinusitis in Children. *Am. Jour. Med. Sci.*, 199:865, 1940.
16. HANSEL, F. K.: Allergy of the Upper and Lower Respiratory Tracts in Children. *Ann. Otol., Rhinol. and Laryngol.*, 49:579, 1940.
17. GEWANTER, R.: Conservative Treatment of Sinusitis in Children. *Arch. Otolaryngol.*, 32:728, 1940.
18. KERLEY, C. G.: Sinusitis in Children from a Pediatric Standpoint. *Arch. Pediat.*, 55:732, 1938.
19. TUMPEER, I. H.: The Upper Respiratory Revenge of the Allergic Child. *Ill. Med. Jour.*, Jan., 1940.
20. GROVE, R. C.: The Use of Colloidal Thorium Dioxide in Roentgenography of the Paranasal Sinuses. *THE LARYNGOSCOPE*, 50:1165, 1940.
21. THIENPONT, R.: Le radio-diagnostic des affections allergiques du nez et des sinus. *Bull. Soc. belge d'otol., rhinol., laryngol.*, p. 32, 1939.
22. JOHNSON, V. C.: The Value of Roentgen Examination of the Paranasal Sinuses. *Radiol.*, 32:303, 1939.
23. MILLER, H., and PINESS, G.: Potassium Salts in Hay Fever. *Jour. A. M. A.*, 114:1627, 1940.
24. RUBIN, S. S.; AARONSON, A. L.; KAPLAN, M. A., and FEINBERG, S. M.: Potassium Salts in the Treatment of Pollinosis. *Jour. A. M. A.*, 114:2359, 1940.
25. RUSK, H. A.; DEAN, L. W., JR., and RINDSKOPF, W.: Results of Potassium Therapy in Nasal Allergy. *Ann. Otol., Rhinol. and Laryngol.*, 49:76, 1940.
26. HARSH, G. F., and DONOVAN, P. B.: Potassium Chloride in Allergic Disorders. *Jour. A. M. A.*, 114:1859, 1940.
27. GATEWOOD, E. T.: Of What Value Is Roentgen Therapy for Sinusitis? *Arch. Otolaryngol.*, 31:275, 1940.
28. GUNDRUM, L. K.: Treatment of Sinusitis by the Displacement Method. *THE LARYNGOSCOPE*, 50:989, 1940.
29. WALSH, T. E.: Intranasal Vaccine Spray: Its Use in Prophylaxis Against the Common Cold. *Ann. Otol., Rhinol. and Laryngol.*, 49:875, 1940.
30. THACKER, E. A.: The Treatment of Chronic Obstructive Rhinitis with Submucosal Injections of Sodium Psylliate. *Ann. Otol., Rhinol. and Laryngol.*, 49:939, 1940.
31. MILLER, M. V.: Edema of the Larynx. A Study of the Loose Areolar Tissues of the Larynx. *Arch. Otolaryngol.*, 31:256, 1940.
32. FRANK, D. I.: Angioneurotic Edema of the Larynx Due to Sensitivity to Chicle. *Arch. Otolaryngol.*, 32:1067, 1940.
33. BOZER, H. E.: Bronchial Collapse Without Clinical Signs of External Pressure: Bronchoscopic Observations. *Ann. Otol., Rhinol. and Laryngol.*, 49:1091, 1941.
34. VADALA, A. J.: Mycotic Infection of the Bronchopulmonary Tract. *Ann. Otol., Rhinol. and Laryngol.*, 49:291, 1940.
35. PRICKMAN, L. E., and MOERSCH, H. J.: Bronchostenosis Complicating Allergic and Infectious Asthma. *Ann. Int. Med.*, 14:387, 1940.

36. THOMAS, J. W., and WARREN, W. A.: Analysis of Thirty Consecutive Cases of Allergic Conjunctivitis. *Cleveland Clin. Quar.*, 7:3, 1940.
37. BOWEN, R.: Allergic Conjunctivitis, *South. Med. Jour.*, 34:184, 1941.
38. LEHRFELD, L., and BREISACHER, C. F.: A Case of Trichinosis Presenting Chemosis of the Bulbar Conjunctiva. *Jour. A. M. A.*, 115:1794, 1940.
39. MARKIN, L., and KYES, P.: Species Specificity of Proteins of Optic Lens. *Jour. Infec. Dis.*, 65:156, 1939.
40. BEETHAM, W. P.: Atopic Cataracts. *Arch. Ophthalmol.*, 24:21, 1940.
41. SKOOG, T.: Studies of a Vestibular Syndrome Induced in Guinea Pigs by Allergic Reaction. *Acta Oto-laryngol.*, 32, Supp., 1939.
42. CRIEF, L. H.: Allergic Vertigo. *Pa. Med. Jour.*, 43:258, 1939.

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**PROGRESSIVE ANALOGOUS NERVE DEAFNESS IN
THREE SUCCESSIVE GENERATIONS WITH
SEX-LIMITED INHERITANCE.***

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Hemophilia, as the first illustration in man of a sex-limited inherited malady, was described by John C. Otto in 1803. Neurology's contribution to this phenomenon is amaurotic family idiocy, and has been ably described by Tay and Sachs. Many forms of this disease are known to exist: the infantile and late forms, a juvenile malady occurring between the eighth and twelfth years, associated with blindness, without macular changes, and with no racial predilection, and the familial macular degeneration without dementia that starts about puberty. All have a dominant Mendelian character; 50 per cent of the children in the family are affected, and all those affected are of the same sex. As to the etiology, Sachs¹ states that these children are born with a nervous system so inadequate that the cells, after functioning for a few months or years, undergo complete degeneration. The nervous system in the afflicted is like a poor battery that lasts only a short space of time and loses its spark — its life. This weakness is inherited, and this inheritance possesses peculiar sexual and sometimes racial characteristics.

Our presentation concerns three cases of familial deafness in granddaughter, Case 1; mother, Case 2; grandmother, Case 3. The extraordinary features are that no male members of these families was affected; each patient has one or more brothers with normal hearing; the high octave hearing was impaired first, and in the case of the grandmother, deafness to these tones became complete. If we believe in the theory of localization of hearing in the cochlea, we may postulate that the cells in the basal turn of the cochlea are so inadequate that they are the shortest lived, and that the cells in the apex in these patients have greater vitality, though falling below

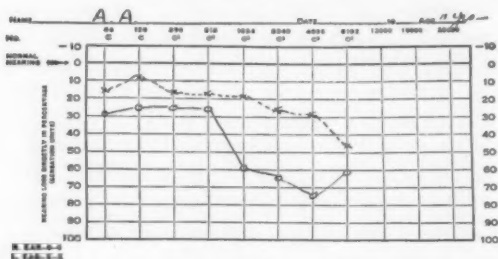
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the standard in stamina when compared to those in normal individuals. These cases will constitute an illustration of a sex-limited inherited disease in the field of otology.

Case 1: A. A., a girl, age 11 years, complained of slight deafness in her right ear of about two years' duration. At that time the teacher noted that the child did not hear so well. No tinnitus aurium was present. On rare occasions she was conscious of a bell-like sound. During infancy she had had an otitis media. She has an older brother and sister who have normal hearing. On physical examination, the child is a healthy girl, measuring up well to normal standards, both physically and mentally. Urinalysis is negative. Blood count is normal, and Wassermann is negative. Otologic examination reveals the drums to be slightly retracted, particularly the right, and the Eustachian tubes patent. The tonsils have been enucleated and there is no evidence of any sinus infection. Hearing tests showed both ears to be subnormal. Spoken voice was heard at 30 feet. The watch tick was heard at a distance of 10 inches from the left ear, and none at all on the right ear. By the C tuning fork (128 d.v.)

AUDIOMETER CHART.



Audiogram. Case 1. A. A., age 11 years.

the following results were obtained for air and bone conduction: Ac-Bc N. This was true in both ears. The Weber test showed lateralization to the left. There was a diminution of hearing for all the octaves in both ears, the loss being greater in the right ear and the drop being precipitous for the high tones in that ear.

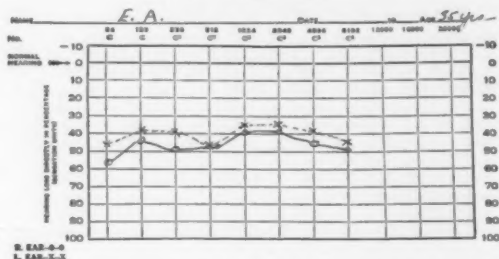
Case 2: E. A., a housewife, age 35 years, the mother of patient, Case 1, is the youngest sister of five normal hearing brothers and two sisters. In her early youth, this patient noticed that she was becoming deafened in her right ear. Later on, her left ear also became impaired. She started having head noises when she began to menstruate, which was at the age of 12 years. This became aggravated after pregnancy and after a miscarriage which occurred about eight years ago, and is getting progressively worse. The patient is a well developed woman with no physical complaints, and is of normal intelligence. On physical examination no abnormality was found with the exception of the loss of her right eye in an accident. Urinalysis is negative. Wassermann is negative, and blood count is of a normal character. Otolaryngologic examination discloses no infection in the upper passages. The tonsils have been removed. The Eustachian tubes are patulous. The eardrums are retracted, particularly the right one. Hearing tests showed both ears to be in an advanced state of deafness. The watch tick was heard at a distance of one inch from the right ear, and at the same distance from the left ear. By the C tuning fork (128 d.v.) the following results were obtained as the ratio

between air and bone conduction and their relation to normal hearing: Ac-Bc N.

This was true in both ears. The Weber test showed lateralization to the left side. There was a diminution of hearing for all the octaves in both ears, the loss being somewhat greater for the right ear.

Case 3: M. N., a housewife, age 62 years. Deafness began at the age of 26 years. This case is the mother of patient, Case 2, and the grandmother of patient, Case 1. This patient is suffering from an advanced form of deafness. She is the youngest of five children—two normal hearing brothers and one deaf sister. She is suffering from head noises of many years' duration but cannot remember the details of their start and progress. On physical examination, no abnormalities were noted

AUDIOMETER CHART.



Audiogram. Case 2. E. A., age 35 years.

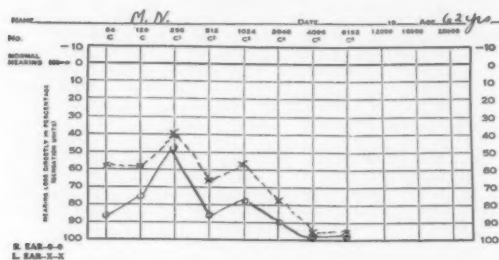
except that she is suffering from hypertensive cardiovascular disease of a moderate degree. She gives a history of eight pregnancies, with her hearing becoming worse after each pregnancy. Urinalysis shows a slight trace of albumin; otherwise negative. Wassermann is negative. Blood count shows no abnormalities. Otologic examination reveals the eardrums to be retracted and having some calcareous deposits. There is no evidence of any sinus infection, and the tonsils are quite atrophied. The Eustachian tubes are patent. Hearing tests reveal an advanced stage of deafness. Loud spoken voice was heard about five feet. The watch tick was barely audible when in contact with the left ear, and was not heard at all by the right ear. By the C tuning fork (128 d.v.) the ratio was Ac-Bc N. This was true in both ears. The Weber test showed lateralization to the left. There was more than 50 per cent loss of hearing in all the octaves except fork 256 d.v., when the loss was only 40 per cent. The loss for higher tones, 4,096 d.v. and 8,192 d.v. was 100 per cent. This patient remembers distinctly that the right ear was involved first and was always the worse of the two ears.

COMMENT.

The existence of a symmetrical law of hereditary deafness was stressed by B. Langenbeck.² He found the hearing curves to be practically identical. Only minor variations were noted as the result of superimposed inflammation. The argument for this theory is that Nature is symmetrical in its manifes-

tations. The color of both eyes is generally uniform. The right arm conforms in its various particulars to the left one, and the teeth in one side of the mouth resemble very closely those on the other side. This theory is plausible enough as far as normal anatomy is concerned; however, as regards disease or a degenerative process, the validity of this assumption is to be questioned. Is it not true that one eye may lose its sight first? Our cases point to the fact that in each member of the successive generations the right ear became involved first. It must be admitted, however, that both ears possessed the same

AUDIOMETER CHART.



Audiogram. Case 3. M. N., age 62 years.

hereditary deficiency in each instance and, in the case of the grandmother the hearing curves were nearly identical, the disease having progressed almost to its limit.

The histologic basis of hereditary deafness is a matter of scientific controversy. There is W. Lange,³ who found in his specimens evidences of neuroepithelial degeneration. On the other hand, W. Uffenorde⁴ found in his specimens evidences of middle ear inflammation that in turn caused purulent labyrinthitis and progressive deafness. This author is firm in his conviction that this induced labyrinthitis is an important cause of deafmutism. He is even convinced that symmetrical hearing loss and remnants occur in acquired deafness. As regards our cases, there was no clinical evidence of severe middle ear disease in any one of our patients. The likelihood that an identical inflammatory process should strike grandmother, mother and granddaughter is a very remote possibility. How can one account for the existence of immunity to such an infection in all the male members of the three generations? The sexual predilection in each generation is a

phenomenon that cannot be explained upon either a histologic or a biochemical basis. There must be a greater significance behind the Mendelian Laws than cellular pathology can explain.

The fact that there was endocrine influence in one of our patients raises the question of the classification of this affection. Is it related to otosclerosis? Patient No. 2 states that she began having head noises when she started to menstruate, and that the tinnitus aurium became worse after a miscarriage. Such a history is often obtained in otosclerosis. This gave rise to a school of thought that endocrine disturbance is the causative factor. We may state that our patients suffer from an affection which is related to otosclerosis but is not otosclerosis itself. None of them had Bezold's triad symptom complex, and all the other clinical manifestations and course are atypical of otosclerosis, as are the audiograms. Hammer-schlag,⁵ however, claims that the various diseases of the inner ear are not distinct diseases but are only subdivisions of a nosologic entity, for which he proposes the name heredopathia acoustica. Under this term he includes hereditary degenerative total deafness, progressive labyrinthine deafness, premature presbycusis and otosclerosis. The serious forms date back to fetal life and represent pathologic developmental anomalies; the mildest forms do not appear until adult years and pass over unnoticeably into the physiologic deafness of old age.

Our cases present the unique characteristics of involving 50 per cent of the females of three successive generations and affecting first the right ear in each instance, while all the male members of the family possess normal hearing. These features follow Mendelian Laws. Our cases constitute an illustration of progressive analogous nerve deafness in three successive generations with sex-limited inheritance.

BIBLIOGRAPHY.

1. SACHS, B.: Chapter in Osler and McCrae's System. Lee and Febiger, Philadelphia. Vol. 5.
2. LANGENBECK, B.: *Ztschr. f. Hals., Nasen. u. Ohrenheilk.*, 39:223-261, Jan., 1936.
3. LANGE, W.: *Ztschr. f. Hals., Nasen. u. Ohrenheilk.*, 41:1-14, 1936.
4. UFFENORDE, W.: *Erbbl. f. d. Hals., Nasen. u. Ohrenheilk.*, 4:43-53, Dec., 1936.
5. HAMMERSCHLAG, V.: *Klin. Wchnschr.*, 12:1903, Dec. 9, 1933.

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LIMITATIONS OF SURGERY IN OTOSCLEROSIS.
A NEW THEORY FOR THE IMMEDIATE
IMPROVEMENT OF HEARING IN
FISTULA OPERATIONS.

DR. BENJAMIN KATZ, Los Angeles.

HISTORICAL REVIEW.

When Kessel, in 1876, removed the stapes in otosclerosis with the idea of replacing the footplate by movable scar membrane, this operation was based on the erroneous assumption that ankylosis of the stapes was the only pathological feature of the disease; however, latest investigations proved that deafness in otosclerosis is by no means entirely dependent upon fixation of the stapes.¹ Other foci of bone degeneration can be found; namely: *a.* surrounding one side of the cochlea and often extending to the internal auditory meatus; *b.* about the round window; *c.* about the semicircular canals.² It was demonstrated, also, that degenerative changes may occur in the medullary sheath and neurilemma of the cochlear nerve even in early cases of otosclerosis before ankylosis of the stapediovestibular joint develops (Gray, p. 639). Autopsies disclose that in one out of 20 adults, otosclerotic changes can be found in the ear, while only less than a quarter of the affected ears show symptoms of ankylosis of the stapes.³

In spite of these new pathological facts, all surgical attempts to improve hearing in otosclerosis were directed to correction of the ankylosis of the stapes, without due regard to other features of the disease and without due consideration to the latest experimental observations, which will be mentioned below.

When Jenkins,⁴ in 1913, performed a fistula operation on the external semicircular canal and covered the fistula with a flap, he had an idea that the labyrinthine fluid might be at fault in otosclerosis.

His attempts met with failure, likewise those of Barany.⁵ While Holmgren⁶ greatly improved the technique of the oper-

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ation by introduction of magnifying instruments (Zeiss binocular microscope), the idealogical background for the operation remained the same. Immediate improvement occurred after operation, but, according to Holmgren, "the end-results were minute" because a bony covering of the fistula occurred. Guggenheim⁷ states, in a personal communication in 1937, Holmgren informed him that all his patients operated upon for otosclerosis again lost their hearing, and that his experimental animals, without exception, showed that the fistulae promptly closed with new bone.

Sourdille⁸ made another step in the progress of operation by introducing the plastic tympanolabyrinthine flap, an improvement of the Jenkins flap made from the skin of the external meatus.

While it takes Sourdille three separate operations (three steps) to accomplish his task, Howarth⁹ performs the operation in two stages. He reported, in 1937, the results of operations on seven patients, all of which met with failure.

ANALYSIS OF LEMPERT'S OPERATION.

Lempert¹⁰ modified the technique so as to perform the operation in one stage, choosing the endaural route and avoiding the opening of the mastoids. The technique of the operation is very complicated, and it takes Lempert 25 pages to describe it; however, the principal mechanism for mobilization of hearing remains the same as in the Sourdille operation. Lempert incorporates in his technique another feature which greatly adds to the hazards of the operation, the reason for which is more than disputable. Because Wittmaack,¹¹ by producing, in 1919, a venous stasis in the region of the labyrinthine capsule in fowls, claimed to obtain the same changes in the bone that occur in otosclerosis, Lempert removes the dura plate of the temporal lobe in the region of the epitympanic process. Wittmaack's claims were disproved by Kamino, in 1924, who repeated Wittmaack's experiments but obtained no otosclerotic changes. Oesterle¹² studied 50 temporal bones from normal fowls and found that the normal capsule shows the criteria for otosclerosis, while producing venous stasis, results in no changes in the bones which can be compared to human otosclerosis.

In spite of these latest observations, the correctness of which in part was acknowledged by Wittmaack himself, Lempert removes the dural plate and exposes the dura to stop the mythical "venous stasis" of Wittmaack.

A superficial perusal of Lempert's paper is very impressive, particularly because of beautiful illustrations and charts. A close study, however, reveals many discrepancies and subjective judgment in evaluation of the results of operations.

In Case 1, the patient had, preoperatively, a 76.5 per cent loss of hearing in the left ear, and had a fistula operation on Dec. 28, 1937. By Jan. 9, 1938, the loss of hearing in the left ear was 49 per cent—an improvement of 27.5 points; however, by May 14 the fistula closed and the improvement of hearing was lost. In explanation of this case, Dr. Lempert says that this patient was never tested preoperatively by bone conduction, and this was a case of nerve deafness. It is natural to ask the question, how could the hearing improve 27.5 points after operation and drop back after the fistula closed if this was a case of nerve deafness?

To illustrate the subjective judgment of the results of operations it is sufficient to cite Case 3, in which the patient after the fistula operation had 48.75 per cent loss of hearing in the right ear, and 65.875 per cent loss of hearing in the left ear. In commenting on this case, Dr. Lempert says that with such loss of hearing, the patient "for practical purposes could hear almost normally." A similar case of subjective judgment is obvious in Case 12, in which the patient had postoperatively 63.5 per cent loss of hearing in the left ear. Commenting on this case, Dr. Lempert says that the patient heard well enough to be able to seek employment, while patients with much less degree of loss of hearing than in Cases 3 and 12, were considered possessing poor hearing and operated upon.

In Case 6, a bilateral fistula operation was done which resulted in a 50 db. loss of hearing in the right ear and no gain in the left ear. In commenting, Dr. Lempert says that this case is not suitable for operation, without stating the reason for this and does not explain the cause for the loss of 50 db. of hearing in the right ear after operation.

Case 14 demonstrates that a gain of 25 points can be obtained without a fistula operation. In this case a patient with a loss of hearing of 88 per cent in the right ear and 75 per cent loss in the left ear underwent a radical mastoidectomy on Jan. 7, 1937; he gained 25 points of hearing after this operation, although no fistula operation was done at this time. On March 19, 1937, the right semicircular canal was opened and the hearing improved, but dropped back on the third day to the preoperative level.

Case 14 demonstrates another very important fact, that there is a difference between an improvement registered by audiometer and "practical" improvement. The left ear was operated on Jan. 11, 1938; the preoperative hearing test showed 75 per cent loss of hearing. The postoperative test on Jan. 22, 1938, showed a 60 per cent loss—a gain of 15 points in comparison with the preoperative hearing. In commenting on the case, Dr. Lempert says that, despite the impressive audiometric improvement, no "practical" improvement was noted.

Case 15: Gain of hearing in the operated ear, 17 points; in the one not operated on, 10 points.

TABLE I.—FOR ILLUSTRATION OF DURATION AND POINTS OF IMPROVEMENT IN LEMPERT'S CASES.

Cases	1	2	3	4	5	6	7	8	9	10	11	12
Duration in months	3	4	2½	3	2½	¾	2	2½	1½	1½	1½	1
Points of improvement in operated ear	0	30	22	30	19	—38	33	16	16	19	25	26
Points of improvement in ear not operated on	0	7	8	8	1½	8	8	7	—16	—6	0	6½
Cases	13	14	15	16	17	18	19	20	21	22	23	Av.
Duration in months	½	3	¾	½	¾	1	1	2½	2½	¾	¼	1½
Points of improvement in operated ear	20	0	17	17	14	0	22	15	17	16	13	16
Points of improvement in ear not operated on	8	0	10	20	0	0	4	4	5	7	7	4

Case 16 demonstrates that the gain of hearing after Lempert operation was greater in the ear not operated than in the one which was operated upon. The patient gained 17 points of hearing in the operated ear and 20 points in the one that was not operated.

From the chart presented one can see that, in the first place, in about half of the cases the period of observation since the operation is four weeks or less, the average being one and one-half months, which is entirely insufficient for a final judgment of results; second, there is a spontaneous improvement of hearing in the ear not operated upon as high as 20 points in Case 16, the average being about four points; third, the average improvement of hearing in the operated ear is about 16 points; if from this average one deducts the average improvement in the unoperated ear, the actual sum of improvement is rather small to justify a fistula operation with all the dangers attached to it.

DANGERS OF FISTULA OPERATIONS.

Although Sourdille and Lempert had no mortality in their experience, this is not always the case. Holmgren¹³ reported, in 1938, a case in which a patient died from embolus of the pulmonary artery following a fistula operation for otosclerosis.

I had personal experience in labyrinth operations during five years of my association with Prof. S. von Stein, who long before introduction of the colorimetric test by Bárány, worked out the rotation test and who freely operated on the labyrinth for various conditions, publishing his results in 1910 in a large monograph.¹⁴ Stein had some mortality cases. Incidentally, for opening of the labyrinth, Stein used electric burr instruments employed also by Lempert in his technique.

THE MECHANISM OF IMMEDIATE IMPROVEMENT OF HEARING IN FISTULA OPERATIONS.

All investigators report an immediate improvement of hearing in fistula operations, the nature of improvement being explained differently by Holmgren and Sourdille. Holmgren explained this improvement by decompression of the labyrinth. Sourdille explains it by "the mechanism of the half-

filled flask" due to half-emptiness of the perilymphatic space which creates a free surface of perilymph; this insures a greater mobility of the perilymph with an increase of hearing. In my opinion, Holmgren and Sourdille's explanations are not satisfactory and not in accordance with other known facts. When a fistula is made in a canal, the perilymph escapes from all canals to the level of the fistula, and a free surface of perilymph is created. If the increased mobility of this free surface of the perilymph would be the only factor in improvement of hearing, as Sourdille states, then no more improvement could be obtained; however, when Holmgren, in 1936, made multiple openings of two or three canals he noticed that with each new opening of a canal a corresponding increase in the hearing was obtained.

THE AUTHOR'S THEORY.

In explanation of the immediate improvement of hearing in fistula operation, I would like to advance a theory of "suction action" of escaping perilymph, same as occurs in a water pipe suction apparatus. The escaping water, or perilymph in the labyrinth, creates a vacuum, with the result that more blood is brought to the labyrinth, causing an improvement of hearing. If multiple openings are made, more perilymph escapes and thus increases the suction, with a corresponding increase of blood supply and hearing.

That the question of blood supply to the ear plays a very important part in mechanism of hearing can be seen from the fact that out of eight different theories of etiology of otosclerosis, four of them, namely, Mayer's theory of vascular constriction; Siebenman's, of altered vascularization due to inflammatory process in the tympanic cavity; Wittmaack's, of venous stasis; and Gray's, of a defect in the vasomotor mechanism of the ear, attribute the cause of the disease to insufficient or defective supply of blood to the ear. Gray's theory in particular explains very satisfactorily various facts related to otosclerosis, as, for instance, improvement of hearing in otosclerosis when rapid changes in the distribution of blood in the body takes place (Gray, p. 641) during head colds, after attacks of hay fever, after drinking alcohol or when the patient inhales nitrite of amyl. This theory also explains the preponderance of women among the victims of

the disease, as vasomotor disturbances occur in pregnancy and during menstruation. Gray's theory is substantiated by experimental observations of Rainisch,¹⁵ that epinephrine, by causing a constriction of blood vessels, lowers the hearing in otosclerosis.

The "suction action" theory advanced by me is in accord with Gray's theory of etiology of otosclerosis and clearly explains the mechanism of immediate improvement of hearing in fistula operation. The rest of the theories of etiology of otosclerosis, namely, Fraser's, of a chronic local infection in the mucoperiosteum; Manasse's, of a chronic inflammation; Pierce's, development from the part of the labyrinth last ossified; and Guggenheim's, of regression, do not contribute much to the understanding of the phenomenon of sudden improvement of hearing in fistula operation nor explain all known facts pertaining to otosclerosis.

THE IMMEDIATE IMPROVEMENT OF HEARING CANNOT BE MAINTAINED.

Whether Holmgren or Sourdille's theory should be accepted, or the "suction action" theory of mine, it is obvious that the immediate improvement of hearing cannot be maintained unless the fistula remains indefinitely open to insure the escape of the perilymph, in order to secure the Sourdille "free surface" of the perilymph or "suction action" of the escaping perilymph outlined by me. Holmgren tried to prevent the fistula from closing by covering it with a piece of gold foil but failed in his task because the edges of the gold foil became covered with connective tissue, thus preventing the free outflow of the perilymph. Holmgren tried a direct method of mobilization of sensitivity of the perilymph by implanting fat into the wound and covering the fistula with gutta-percha but failed in his efforts, too.

In order to overcome all these obstacles, Sourdille, in his latest attempts, created an *indirect* mechanism for mobilization of the sensitivity of the perilymph in a *closed* canal by means of a plastic tympanolabyrinthine flap. He joins the covering membrane of the fistula with the superior border of the membrana tympani, whose excursions are increased by resection of the head of the malleus. By adopting this tech-

nique, Sourdille actually abandons his own theory of "free surface of the perilymph" as a cause of improvement of hearing in fistula operations. It is obvious that in a closed canal there can be no "free surface of the perilymph" as the canal will be quickly refilled, reversing the labyrinth to the status before fistula operation.

What are the results of operations with this new plastic flap? Sourdille claims good results; however, he mentions that "in a great number of cases, unfortunately, the success is ephemeral: four, six or 10 weeks later one sees the aural hearing diminish, Rinné becomes negative, and Weber indifferent." It is problematical whether this tympanolabyrinthine flap of Sourdille can function properly because of its artificial character, as it is bound to be imbibed into connective tissue and scars, with final ossification of the fistula. In fact, Sourdille had to reopen the fistula two or three times in some cases in order to keep it from closing. As Lempert employs the same mechanism for mobilization of hearing, his results could not be better than those of Sourdille. To prove that the complicated Lempert operation does not insure the fistula from closing, it is sufficient to cite Cases 1 and 14 (right semicircular canal), in which the fistulae closed after operations and the improvement of hearing was lost.

SUMMARY.

Latest pathological studies demonstrate that in otosclerosis, the whole ear, including the nerve, can be involved. It is clear that surgery cannot stop this pathological process. Analysis of the mechanism of the immediate improvement of hearing in fistula operations for otosclerosis reveals that this improvement cannot be maintained after the fistula closes and the perilymph ceases to escape. All attempts for direct mobilization of the sensitivity of the perilymph by prostheses — such as fat and gutta-percha — completely failed. The method of indirect mobilization of the perilymph by a tympanolabyrinthine flap, introduced by Sourdille and adopted by Lempert, is an artificial arrangement, the function of which is bound to be interfered with by granulation and scar formation and ossification of the fistula. The elimination of the three stages in operation by Lempert does not in the least influence the results of the operation as far as hearing is

concerned. The removal of the dural plate with exposure of the dura as practiced by Lempert, supposedly to stop the venous stasis, is based on an old theory of Wittmaack which was proven erroneous by latest experimentation and should be discontinued. Analysis of Lempert's reports reveals that as much as 20 points of improvement in Case 16 are observed in the ear not operated, and as much as 25 points after a radical mastoid operation (Case 14). The case reports reveal a great deal of discrepancies and subjective judgment of results of operation. The period of observation of cases after operations is not sufficient for final conclusions of the results of Lempert's operations.

In order to avoid subjective judgment of results in fistula operations for otosclerosis it would be advisable to examine the patients preoperatively and postoperatively by a committee of experts, the examination to be done by a standard type of audiometer and also by adopted practical methods of testing the ear, because both methods do not always correspond, as one can see from Lempert's case reports. An allowance of eight or 10 points must be made for the audiometric readings, as four points of improvement are recorded in the average ear not operated upon by Lempert. The same allowance must be done for variation of hearing due to change of weather, nervous state of patient, and so on. A fistula operation must be recognized as a brain operation and not be taken lightly.

In order to explain satisfactorily the immediate improvement of hearing in fistula operations, a new "suction action" theory is offered by this author, which is in accord with most accepted theories of etiology of otosclerosis.

REFERENCES.

1. GRAY, G.: The Otosclerosis Problem. *Jour. Laryngol. and Otol.*, 49:629, Oct., 1934.
2. HAGENS, E. W.: Pathology of Otosclerosis. *Trans. Amer. Laryngol., Rhinol. and Otol. Soc.*, p. 406, 1935.
3. FOWLER, E. P.: The Factual Background for the Treatment of Progressive Deafness from Otosclerosis. *Bull. N. Y. Acad. Med.*, 13:12, Dec., 1937.
4. JENKINS, G. J.: Treatment of Otosclerosis. *Jour. Laryngol., Rhinol. and Otol.*, 11:520, Nov., 1914.
5. BARANY, B. R.: Die Indicationen zur Labyrinthoperation. *Acta Otolaryngol.*, 6:260, 1924.
6. HOLMGREN, G.: *Ann. Oto-Rhino-Laryngol.*, p. 3, March, 1937.

7. GUGGENHEIM, L. K.: The Diagnosis and Treatment of Otosclerosis. *Amer. Jour. Surg.*, 42:156, Oct., 1938.

8. SOURDILLE, M.: New Technique in the Surgical Treatment of Severe and Progressive Deafness from Otosclerosis. *THE LARYNGOSCOPE*, 47:12:853, Dec., 1937.

9. HOWARTH, H. W.: The Surgical Treatment of Otosclerosis. *St. Thomas Hosp. Rep.*, 2:153, 1937.

10. LEMPERT, JULIUS: Improvement of Hearing in Cases of Otosclerosis. *Arch. Otolaryngol.*, p. 42, July, 1938.

11. WITTMACK, K.: Die Ursache der Otosclerose. Ein Vorschlag zur ursachlichen Behandlung. *Arch. f. Ohren., Nasen. u. Kehlkoph.*, 129:150, June, 1931.

12. OESTERLE, F. O.: Die normale Histologie und Biologie der Hühnerlabyrinthkapsel im Hinblick auf die experimentelle Hühnerotosclerose. *Arch. f. Ohren., Nasen. u. Kehlkoph.*, 143:362, 1937.

13. HOLMGREN, G.: Ein Operierter Gestorben Fall von Otosclerose. *Acta Oto-Laryngologica*, 26:340, 1938.

14. STEIN, S. VON: Schwindel. Neue Funktion der Schnecke. Leipzig. o. Leiner, 1910.

15. RAINISCH, S. M.: Wirkung von Vegetative Giften auf Schwerhörige. *Arch. Sov. Otol.*, 3:64, 1937.

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HISTORY OF PLASTIC SURGERY.*

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We restore, repair and make whole those parts of the face which Nature has given but which Fortune has taken away, not so much that they may delight the eye but that they may buoy up the spirit and help the mind of the afflicted.—Tagliacozza.

From time immemorial reconstruction of the nose has been performed, according to the early records of India, for the relief of disfigurement caused by the primitive mutilation of the nose. The idea of plastic surgery arose from Brahma, The First Cause.¹ This legend was handed down from that early time, and apparently appeared in print about the fourth or fifth century B.C., in the records of Susruta Samhita,² the Eternal Ayurveda (Sacred Medical Record of Hindus), or Medical Science. Operations, mainly for rhinoplasty, were then done in the Indian temples (the early methods had little to be commended, since they were designed only for the replacement of the skin of the nose).³ The original ideas are said to have been "shackled with mythological doctrines." But in spite of the fact that they regarded life itself simply as "an illusion,"⁴ the need for plastic surgery found a place at that time.

The immortal Sappho cried, "He who is beautiful to look upon is good." Thus the Greeks express their philosophy of beauty of the human body. The beauty "was, therefore, to be perpetuated in all its perfections, in the offspring, in color and in marble."⁵

From India the knowledge of the methods of the practice to plastic surgery spread to Egypt, where mention of it appears in the Ebers papyrus, and thence to the European continent through Greece and Italy, and thence to Asia.

The practice of mutilation was then common among many peoples. It was the fate not only of captives in the wars and of criminals but also of young girls who were guilty of amorous transgressions, and of wives who proved unfaithful, to be

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punished by having their noses cut off by offended fathers and husbands. Not only noses but lips, ears and one or both hands were sometimes sacrificed.

There is the story of an Indian potentate, King Ghoorha, who, having captured a hostile city, and in order to remind them of his power, commanded that the noses of all the inhabitants except infants and adults who played wind instruments should be cut off. This city was afterward known as The City of Cut Off Noses.⁶ Such disfigurement was a common occurrence, and it was an economic substitute for imprisonment.

Reparative surgery by transplantation of tissue is not mentioned in the works of Hippocrates (460 B.C.), but it was practiced and described by Aulus Cornelius Celsus (a Roman physician and philosopher who lived in the time of Augustus) about 50 A.D., and also during the time of Tiberius (10 B.C.-54 A.D.). In the second century, Galen (130-200 A.D.) also described the restoration of lost body tissues.⁷ In the seventh century, the great emperor, Justinian (677-711 A.D.), is known to have had a plastic operation. A marble bust of the emperor, which is now in Venice, shows the scar on the forehead, which resulted from the removal of the patch of skin used in rebuilding his nose.

About the middle of the fifteenth century (1443), Branca, a famous Sicilian surgeon, reconstructed noses from pedunculated flaps of skin from the face. At this time also, during the Renaissance, Tagliacozzi (1597), professor of anatomy and medicine at Bologna, developed methods that are still in use today in correcting facial defects, and this led to his being regarded as the father of modern plastic surgery. It was then allowable to restore a nose only if it had been cut off; not if it had been destroyed by syphilis, as was of frequent occurrence. He wrote the first systematic treatise on plastic surgery, titled "De Curtorum, Chirurgia per Insitionem," a volume of 298 pages published in 1597. He originated the pedunculated flap from the arm, and this operation was named for him. In the course of time the method was abandoned until 1816, when von Graefe revived it, and reported a successful case. Von Graefe modified the original operative procedure and somewhat simplified it (D'Ammon).

During the fifteenth and sixteenth centuries there was great activity in this field of surgery. In 1497, Benedictus restored noses in which he formed nostrils. In 1600, Fallopius used the skin from the arm to rebuild the nose. In 1673, Fioravanti went to Turpia in Italy, where two brothers named Peter and Paul restored noses by surgical operation. In 1697, Ammanus recorded that it was not permitted to restore a nose without permission of the patient. In 1704, Auria reconstructed noses, lips and ears which had been cut off. In 1834, de la Creuse did a plastic operation on a woman's nose, with skin from her knee used for the graft. The wound was covered with a bandage and the patient put to bed after a foot bath, followed by a special diet which included the administration of lemonade. After three days the dressing was removed (D'Ammon).

In 1837, J. Mason Warren, of Boston, probably did the first successful operation in plastic surgery in the United States. He used a pedunculated flap from the forehead to reconstruct a nose.

In 1842, T. D. Mütter, of Philadelphia, reported three cases of contractures of neck and chin, due to burns, successfully repaired by shifting large, pedunculated flaps from cheeks, forehead and upper lip, with success. The work of Mass, however, gave the greatest impetus to the method.

Animal experimentation on skin grafting appears to have been first tried out in 1804 by Baronio.

The work of Reverdin in France, in 1869, instituted the method which bears his name. He called it "epidermic grafting," although he included very little of the derma. This method spread rapidly to the British Isles and directly to America. At the time this method was developed, antisepsis and asepsis were not yet known to surgery. This method was improved upon by Ollier, of Lyons, in 1872, using larger skin areas and a greater proportion of dermis. The work of both these men, Reverdin and Ollier, was ignored by their own countrymen.⁸

Beside thin layers of epidermis only, it was found that scrapings of the skin surface, called "flakes," could be sprinkled upon a denuded surface and give rise to new skin growth.

In 1874, Thiersch began the use of transplants of whole thickness skin, after careful removal of the adipose tissue. This was actually based on the work of the two French doctors, though credit does not appear to have been given them.

A variety of materials for grafting has been tried out from time to time, as lizard skin, the membranous lining of the hen's egg, superficial layers of young pig skin, lining of the amniotic sac and many others. Davis found that animal grafts would often disappear later. It seems to be generally agreed that the patient's own tissues are the best source of grafts. This, however, may not always be possible and even pedunculated crossed grafting may be necessary. Gillies⁹ reports a case of this type in which the donor was toxic for three days, then there was an interval when both donor and recipient were well, followed by four days during which the recipient was toxic. These grafts at times may appear to heal, but when the pedicle is severed the graft may slough because it has not become vascularized by the recipient's tissues.

Crossed grafts from brother to sister are said to be better than from child to mother, and mother to child is less favorable than brother to brother but much better than child to mother.¹⁰

Hunt sounds a warning against the use of corrosive substances, as acid, for the removal of pigmented moles. In one such case, within six months after treatment, the patient returned with over 300 lesions of melanotic sarcoma.

Warning of quite a different nature is given by Wodak.¹¹ He says that in cosmetic surgery of the face, photographs should always be made both before and after operation. One woman patient on whom he did a facial cosmetic operation, stole the photographs and brought suit for disfigurement. Fortunately, the physician had kept the films, and when the patient learned that he had had other prints made, she disappeared, and that was the end of the matter.

As is often the case, this serious field of surgery became the subject of considerable amusement and much humorous writing. In London, in 1716, Isaac Bickerstaff wrote an article called "The Tattler," or the "Lucubrations."¹² It concerned the surgeon, Tagliacozzi, who was said to live in a German city. The story ran that the first patient of Taglia-

cozzi, the nose-maker, was a great and noble gentleman from Portugal, a Count, who had lost his nose by some means not recorded. Tagliacozzi was said to have grafted a new nose so successfully upon the Count's remaining stump that it was possible for him to snore, smell, take snuff and pronounce the letters "m" and "n"; but there was one difficulty: The man had a dark skin, brown eyes and dark eyebrows. The new nose, on the other hand, had been made from the skin of a blond German porter, and from an unexposed part of the body, so that the colors failed to match. The Count was said to resemble an antique statue, the broken nose of which had been mended with a piece of ivory-colored marble. To prevent a recurrence of the unfortunate result, the physician collected a large number of workmen of all complexions, in order to have a matching shade whenever he operated. The story continues further that he became very famous and opened a fashionable hospital. That at one time there was gathered in his hospital 12 German counts, 19 French marquises, 100 Spanish cavaliers and only one single English squire. But this English squire was so profligate, and relapsed so often, that in two years he had to have five new noses. At last it reached such a point that none of the laborers would contribute any of their skin to make another nose for him. This story was said to have been told as a moral to young Londoners.

During the years when dueling was prevalent in the German universities, when no student of good standing failed to have a scar on his face, even though it might have been acquired through a secret understanding with his barber, as was said to have been the case at times, many humorous stories were told of the experiences of the young student duellists. One tale, which was current in Heidelberg in modern times, told how the end of a student's nose was entirely severed in the course of a duel with swords. In the excitement which prevailed, the fragment of the student's nasal protuberance was lost, much to the dismay of its owner, who pictured with dread having to spend the remainder of his life without a proboscis. The attending surgeon, being a resourceful person, and in an attempt to meet the situation, removed some of the already shaved tissue from this gladiator's chest and promptly stitched it neatly in place on the man's nose. All seemed to go well with the graft and healing promptly took place; but the chagrin of the surgeon and the

dismay of the student can be imagined when it was shortly discovered that the graft was assuming its normal physiological function, and soon produced a lusty growth of hair on the top of his nose.

The many mutilations produced by the late World War and the progressive mechanization of industry have led to the expansion of plastic operations, until at the present time there is hardly any deformity or injury which cannot be repaired with both esthetic and functional effect. The most recent and remarkable plastic operation is without doubt the successful grafting of the corneal membrane of the eye.

The mere physical aspect of plastic surgery is not the only one to be considered. An economic value is recognized. Disfiguring features, whether natural or accidental, not infrequently prove a serious hindrance in securing desirable opportunities for work. Schopenhauer is credited with having said that the fate of innumerable girls has been altered by the slight upward or downward curvature of the nose (Maltz).

The psychic effect also had received a great deal of attention in later times.¹³ Physical defects form the basis of Adlerian psychology, and its influence on the individual now receives particular attention. If a deformed nose causes a mortal wound to man's morale, when a corrective operation is done he feels that he has been liberated from a mental and emotional prison. When the deformity is a still more serious one, the correction will ordinarily bring even greater relief; but it remains an individual question. One person may be in despair over a given physical condition and withdraw within himself, or even commit suicide, while another one will find in his defect only a stimulus to greater effort and accomplishment. The patient's attitude can be seen from the words of one of them who said, "one who has not had such defects cannot know how much suffering and humiliation they cause."¹⁴ One woman who had a conspicuous nose admitted that although she did not actually seclude herself, she felt much more comfortable when she was alone. She felt like a female Cyrano de Bergerac, because no one seemed to see anything but her nose.

The late William Mayo once said, "Every human being has the divine right to *look* human" (Hunt).

Plastic surgery has now come to be truly "handcraft, science and art."¹⁵ This type of surgery is the Cinderella of general surgery.

REFERENCES.

1. AINSLIE, WHITELAW: *Materia Indica*, London, 1826.
2. SUSRUTA'S *Ayurveda*, India, B.C.
3. FOMON, S. WILLIAMS, and WILKINS: *Surgery of Injury and Plastic Repair*, 1939, Chapter 11, Nasal Deformities with Loss of Tissue, p. 741.
4. SUSRUTA'S *Ayurveda*, India, B.C.
5. SAFIAN, JOSEPH: *Corrective Rhinoplastic Surgery*. Paul B. Hoeber, 1935. Historical Outline by Herman Pomeranz, p. xv.
6. MALTZ, M. A.: *New Faces, New Future*.
7. D'AMMON, F. A. MAURICE BAUMGARTEN: *Exposé Critique de la Chir. Plastique*, Grand., 1843.
8. DAVIS, J. S.: *Plastic Surgery*. Philadelphia, 1919.
9. GILLIES, H.: *Development and Scope of Plastic Surgery*. *Northwestern Univ. Bull.*, 35:1, 1935.
10. HUNT, H. L.: *Plastic Surgery of Head, Face and Neck*. 1926.
11. WODAK, E.: *Med. Klin.*, 33:883, 1937.
12. ZEIS, E.: *Literatureu. Geschichte der Plastischen Chir.*, Leipzig, 1863.
13. UPDEGRAFF, J. L., and MENNINGER, K. A.: *Amer. Jour. Surg.*, 25:554, 1934.
14. POSSE, R. P.: *Seman. Med.*, 1:330, 1933.
15. LEXER, E.: *Die gesammte Wiederherstellungschirurg*, Leipzig, 1931.

ACCESSORY REFERENCES.

1. BARSKY, A. J.: *Plastic Surgery*. 1938.
2. CHRISTOPHER, F.: *Textbook of Surgery*, p. 1512, 1939.
3. CODAZZI-AGUIRRE, J. A.: *Curggia Estetica. Estado mental del Morfo. La Semana Med.*, 1:675, 1937.
4. DAVIS, A. D.: *Role of Plastic Surgery in General Practice. Urol. and Cutan. Rev.*, 42:40, 1938.
5. ESSER, J. F.: *Studies in Plastic Surgery of Face. Amer. Surg.*, 65:307, 1917.
6. IVY, R. H., and MILLER, H. A.: *Arch. Otolaryngol.*, 27:662, 1938.
7. MAY, R. M.: *La Transplantation Animale*, Paris, 1932.
8. NOEL, A.: *La Chirurgie Esthetique; son Role Social*, Paris, 1926.
9. SEEMAN, H. V.: *Jahres Kurs f. Aertz. Fortbild.*, 29:31, 1939.
10. SHEEHAN, J. E.: *A Manual of Reparative Plastic Surgery*, New York, 1938.

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THE BACTERIOLOGIC RELATIONSHIP OF DENTAL INFECTION AND CHRONIC HYPERPLASTIC SINUSITIS.*

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It has been a routine procedure in our clinic during the past 10 years to culture immediately all sinus membrane removed by operation and all teeth following extraction. The results of our bacteriologic studies of the sinus membranes have been reported,¹ and in this paper we wish to report our dental studies and make a comparison of the two results. It will not be our purpose to try to prove the etiologic relationship of dental infection to sinusitis or argue the status of the pulpless tooth. Berry² has presented evidence to show the importance of dental infection as a cause of maxillary sinusitis, and Grossman³ in a recent article has done much to clarify the status of the pulpless tooth.

In a paper reporting the quantitative cultures of Roentgenologically negative teeth, Rhoades and Dick⁴ enumerate four difficulties encountered in diagnosing dental infection; namely: "1. pulpless teeth with none or extremely slight changes at the root Roentgenologically; 2. root fragments with negative Roentgenograms; 3. so-called 'residual areas' of bone condensation or rarefaction at site of previous extractions; 4. teeth which respond to the electric current with only slight changes at the tips and about the shaft in Roentgenograms."

They made quantitative cultures from the ground-up root ends of 29 pulpless teeth Roentgenologically negative. The average bacterial count was 51.7 per cent higher than healthy controls. The organisms found were: *Streptococcus viridans* in 29 cases; hemolytic streptococcus in 4 cases; staphylococcus in 27 cases; and pneumococcus in five cases. They concluded that pulpless teeth Roentgenologically negative at the tip are almost as important as a source of infection as those showing definite disease Roentgenologically.

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Haden⁵ studied the bacteriology of 1,500 extracted teeth whose root ends were removed aseptically, shaken in sterile 0.85 per cent sodium chloride and sharp sand and then cultured on a deep tube of glucose brain agar. He found that 4.8 per cent of vital teeth, 62.8 per cent of pulpless teeth with positive Roentgenograms and 46.2 per cent with negative Roentgenograms showed bacterial growths of 10 or more colonies per agar tube. He stated that the nonhemolytic streptococcus is by far the most frequent organism found, and the hemolytic streptococcus is rare.

Burket,⁶ on the other hand, used an "external approach" method, which consisted in aseptically removing a part of the alveolus, thus exposing the apex of the tooth and making a direct culture with the tooth *in situ*. This technique was first stressed by Appleton.⁷ Burket cultured 429 teeth and obtained a positive growth from 43 per cent of the vital teeth, 38 per cent of the carious, 50 per cent of restorations, 68 per cent of exposures, and 72 per cent of the pulpless teeth. Hemolytic streptococcus was present in 10 per cent of vital teeth and 15 per cent of pulpless teeth; streptococcus viridans in 42 per cent of vital and 30 per cent of pulpless teeth.

He also abstracted 21 significant papers published over a 20-year period and found the average frequency of streptococci as follows: Streptococci, 71.3 per cent; streptococcus viridans, 61 per cent; and hemolytic streptococcus, 11 per cent.

Tunncliffe and Hammond⁸ made a very thorough bacteriologic and pathologic study of the pulps of 30 teeth to determine the presence of infection. Teeth immediately after extraction were placed in 88 per cent phenol for 15 minutes, washed in alcohol, flamed, left in alcohol for 15 minutes and flamed again. The teeth were then cultured for eight days in glucose-brain broth to determine their sterility. Thirty teeth which showed no surface infection were then opened aseptically, and smears, cultures and histologic sections were made of the pulps of these teeth. Ten cases, or 33 per cent, of these pulps showed positive cultures. Streptococcus viridans was present in all but three cases. Smears and histologic sections of the pulp showed no significant infection in those cases which grew streptococcus.

Our study is based upon 160 teeth extracted from 100 patients. These patients were all suffering from some allergic manifestation, mostly asthma. Hyperplastic sinusitis was also present in 60 per cent of the cases. All of our cases had complete dental Roentgenograms, which were examined by the Roentgenologist and the dental surgeon. Only those teeth were extracted which the dentist thought showed granulomata or areas of absorption about the shaft or apex. Ninety-two of these 160 extracted teeth were vital, and 68 were pulpless or nonvital. One hundred ten of our cultures were made from the root tips, and 50 were made from swabs of the root and socket made immediately after extraction. We realize the dangers of contamination in the cultures made from the swabs and, therefore, we have reported our bacteriological studies of the canals and sockets in separate tables.

The cultural technique for root tips is as follows: immediately after extraction the tooth is placed in a sterile test tube and taken to the laboratory, where it is placed in 95 per cent alcohol for 15 minutes, flamed and the tip removed aseptically with rongeurs. It is then ground up and some of the material is transferred to infusion broth. The next day some of the beef infusion broth is transferred to blood agar plates. All these procedures are carried out in a special "sterile" room.

The swab cultures were transferred to beef infusion broth and blood agar poured plates by the routine method. Cultures were examined at the end of 12, 24, 48 and 72 hours.

Hemolytic streptococcus was recovered in 11, or 10 per cent, of the root tip cultures. *Streptococcus viridans* was found in 87, or 80 per cent; *staphylococcus albus* in 27, or 24.5 per cent; *staphylococcus aureus* in eight, or 7.2 per cent; and pneumococcus in 5.4 per cent. On the other hand, in the "socket" or root swab cultures the hemolytic streptococcus was present in four cases, or 8 per cent; *streptococcus viridans* in 38, or 76 per cent; *staphylococcus albus* in 37, or 74 per cent; *staphylococcus aureus* in three, or 6 per cent; and pneumococcus in 36, or 70 per cent. The nonhemolytic streptococcus was present in 5.4 per cent of the root tip cultures and 4 per cent of the swab cultures, while the *micrococcus catarrhalis* was only present in less than 1 per cent of the canal cultures, but 10 per cent of the swab cultures. Thus, we see that *staphylococcus*, *streptococcus viridans* and pneumococcus are so much more frequent in the swab cultures than secondary

oral contamination must be assumed to play a great part in these increases. There was no growth in 29, or 26 per cent, of the root tip cultures and only three, or 6 per cent, of the swab cultures. These negative cultures were made from 17 vital teeth and 15 pulpless or nonvital.

In a previous publication¹ on the bacteriology of sinus washings and sinus membranes, we reported the presence of hemolytic streptococcus in 11.7 per cent of the cultures of sinus discharge, in 25 per cent of antral membranes, and in 8.5 per cent of ethmoidal and sphenoidal membranes. The presence of hemolytic streptococcus in 10 per cent of root canal cultures compares favorably with these findings in the sinus washings and ethmosphenoidal membranes but is only two-fifths of the 25 per cent found in antral membranes. This is interesting and significant when we consider that the antrum is the only sinus in close relationship to the teeth. *Streptococcus viridans* was present in 43 per cent of the antral membranes and 10 per cent of the ethmosphenoidal membranes, but is found in 80 per cent of the root tip cultures. *Staphylococcus* was present in 61 per cent of the sinus washings, 57.5 per cent of the antral membranes and 73.8 per cent of the ethmosphenoidal membranes, but was cultured in only 31.7 per cent of the root tip cultures. *Pneumococcus* was present in 14 per cent, 39 per cent and 9 per cent, respectively, of the above-mentioned sinus cultures but occurred in only 5.4 per cent of the root tip cultures. No growth was present in 12 per cent, 4 per cent and 20 per cent of these sinus cultures and in 26 per cent of the dental cultures. Thus, we see that *streptococcus viridans* is much more frequent in the root tip cultures than in any of the sinus cultures, but *staphylococcus* and *pneumococcus* are more frequent in the sinus cultures.

When we compare the cultures made from swabs of sockets and dental roots with those of ground-up root tips after external sterilization, it is interesting to note that the streptococci occur in very close percentages, but the staphylococcus and pneumococcus are present in the swab cultures in much larger percentages, especially the pneumococcus. It is also interesting to note that 26 per cent of the ground tip cultures showed no growth, whereas only 6 per cent of the swab cultures were sterile. It seems probable that contamination was the factor in the larger number of positive swab cultures.

A comparison of Tables I and II will show more clearly the differences between the various dental and sinus cultures. From the results obtained it is difficult to prove that the bacteriology of dental roots has any definite relationship to the bacteriology of sinusitis except for the hemolytic streptococcus which occurred in the sinus washings, ethmosphenoidal, ground root and socket swab cultures within 3 per cent of the same frequency; however, they were two or three times more frequent in antral membrane cultures. It seems quite safe to say that only in those cases where a granuloma of an upper bicuspid or molar tooth involves the floor of the overlying antrum will there be bacteriologic evidence of the importance of dental infection in chronic hyperplastic sinusitis.

TABLE I.
The Bacteriologic Findings in 160 Dental Infections Occurring in
100 Allergic Cases.

Organism	Root Tips (110 Cultures)		Socket and Root Swabs (50 Cultures)	
	No.	%	No.	%
Staphylococcus	35	31.7	40	80
Staphylococcus albus.....	27	24.5	37	74
Staphylococcus aureus....	8	7.2	3	6
Streptococcus	104	95.4	44	88
Hemolytic streptococcus	11	10	4	8
Streptococcus viridans....	87	80	38	76
Nonhemolytic strep.....	6	5.4	2	4
Pneumococcus	6	5.4	36	70
Micrococcus catarrhalis....	1	0.9	5	10
Bacillus mucosus capsulatus	1	0.9	0	0
Bacillus proteus	1	0.9	1	2
No growth.....	29	26	3	6

SUMMARY.

One hundred sixty cultures of ground-up dental roots and swabs of sockets and dental roots showed the presence of hemolytic streptococcus in 10 per cent of the former and 8 per cent of the latter. The streptococcus viridans is the most frequent organism found in ground-up dental root cultures, being present in 80 per cent. Staphylococcus occurred in 31.7 per cent and pneumococcus in 5.4 per cent. A comparison of these cultures with previous studies of the bacteriology of hyperplastic sinusitis revealed that there was a close relationship only in the hemolytic streptococcus group, and even this did not hold true for the cultures of antral membranes, which showed a two to three times greater frequency than the dental cultures. Our studies have showed

that the bacteriology of dental infections has little relationship to that of chronic hyperplastic sinusitis.

TABLE II.
The Bacteriologic Findings in 200 Operative Cases of Chronic Hyperplastic Sinusitis Occurring in Allergic Patients.

Organism	Sinus Washings (365 Cases)		Antrum Membranes (108 Cases)		Ethmoid and Sphenoid Membranes (130 Cases)	
	No.	%	No.	%	No.	%
Staphylococcus	224	61	62	57.5	96	73.8
Staphylococcus albus.....	67	18	16	15	11	8.4
Staphylococcus aureus.....	102	28	20	18.5	23	17.7
Hem. staphylococcus alb....	22	6	11	10	39	30
Hem. staphylococcus aur....	33	9	15	14	23	17.7
Streptococcus	84	22.9	78	71.7	27	20
Hem. streptococcus	43	11.7	27	25	11	8.5
Indiff. streptococcus.....	12	3.3	4	3.7	2	1.5
Streptococcus viridans.....	29	7.9	47	43	14	10
Pneumococcus	52	14	42	39	12	9
Micrococcus catarrhalis	20	5.4	4	-----	0	-----
Bacillus coli	19	5	1	-----	4	-----
Bacillus influenzae.....	7	-----	0	-----	0	-----
Bacillus mucosus capsulatus	1	-----	3	-----	1	-----
Bacillus proteus	6	-----	1	-----	4	-----
Bacillus subtilis	8	-----	0	-----	0	-----
Diphtheroid bacillus.....	10	-----	1	-----	1	-----
Streptothrix	0	-----	1	-----	0	-----
Unidentified organisms.....	21	-----	0	-----	0	-----
No growth.....	44	12	5	4	26	20

BIBLIOGRAPHY.

1. GROVE, R. CLARK, and FARRIOR, J. BROWN: Chronic Hyperplastic Sinusitis in Allergic Patients. A Bacteriologic Study of 200 Operative Cases. *Jour. Allergy*, 11:271-276, 1940.
2. BERRY, GORDON: (a) Dental Caries in Paranasal Sinus Infection. *Arch. Otolaryngol.*, 8:698-706, 1928. (b) Further Observations on Dental Caries as a Contributing Factor in Maxillary Sinusitis. *Arch. Otolaryngol.*, 11:55-66, 1930.
3. GROSSMAN, LOUIS I.: Present Status of the Pulpless Tooth. *Ann. Internal Med.*, 13:1805-1813, 1940.
4. RHOADES, P. S., and DICK, G. F.: Roentgenologically Negative Pulpless Teeth as Foci of Infection; Results of Quantitative Cultures. *Jour. Am. Dent. Assn.*, 19:11, 1932.
5. HADEN, R. L.: A Bacteriologic Study of Chronic Periapical Dental Infection. *Jour. Infect. Dis.*, 38:6:486-490, 1926.
6. BURKET, L. W.: Studies of the Apices of Teeth. *Yale Jour. Biol. and Med.*, 9:271-286 and 347-358, 1937.
7. APPLETON, J. L. T.: Clinical Dental Bacteriology. A Review and a Synthesis. *Dent. Cosmos*, 66:251, 1924.
8. TUNNICLIFF, R., and HAMMOND, C. J.: Presence of Bacteria in Pulp of Intact Teeth. *Jour. Am. Dent. Assn.*, 24:1663-1666, 1937.

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SCARLET FEVER FOLLOWING TONSILLECTOMY.

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Undoubtedly there are many cases of scarlet fever which appear after tonsillectomy has been performed during the incubation period. The question, however, has been raised whether such cases are wound infections, surgical scarlet fever or ordinary epidemic scarlet fever—such as occurs after infected burns or in so-called puerperal scarlet fever. In such a case the introduction of the unknown virus is supposed to take place in the wounds. Although there has been considerable research in this field, there are still two theories as to the bacteriology of scarlet fever, the one holding that some variety of streptococcus to be the cause, and the other that some unknown organism or virus is the cause, either alone or in symbiosis with the streptococcus.

In favor of the streptococcus theory is the evidence that preventive inoculations with streptococcus scarlatinae vaccine diminish susceptibility to scarlet fever, and the evidence of the effects of scarlatinal antitoxin is given by Matthias Nicoll in Nelson's Loose Leaf Medicine, Vol. 1, page 451:

1. The Schultz-Charlton rash extinction reaction. 2. The in vitro neutralization of the toxin by antitoxin. 3. The in vivo neutralization of the circulating toxin by the administration of the antitoxin. 4. When the toxin has disappeared from the patient's blood, the patient's serum acquires the ability to produce the Schultz-Charlton reaction. 5. The striking clinical effects with antitoxin treatment of scarlet fever.

R. Mittermaier reported 12 cases thought to be surgical scarlet fever occurring the second and third postoperative day (Mittermaier, R.: *Ztschr. f. laryngol.*, Bd. 26, H. 2, p. 134, 1935). He believed these cases to be relatively benign. He cited three cases of Hoshiya, three cases of Berberich and Jordanoff, and four cases of von Lovett of surgical scarlet fever after tonsillectomy.

Report of Case: On the third postoperative day after tonsillectomy, J. L., white male, age 6 years, developed a typi-

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cal scarlet fever rash after a chill and temperature rise to 104° F. The disease ran the usual course of scarlet fever and recovered without complications. Investigation revealed

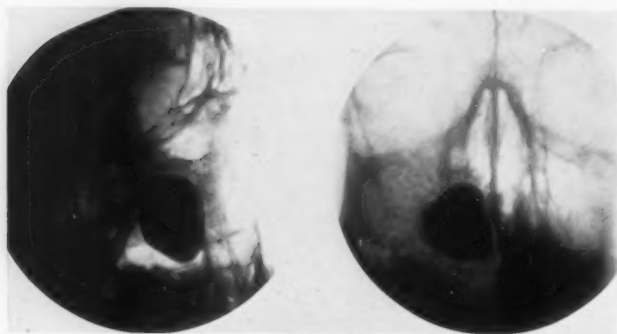


Fig. 1. Cyst injected with poppy seed oil. (1) Lateral. (2) Anterior-posterior view.

that the child had attended school up to the time of the operation, and they had previous cases there; therefore, it was felt that this was an ordinary case of scarlet fever coinciding with convalescence of a tonsillectomy.

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**TRANSIENT BACTEREMIA FOLLOWING
TONSILLECTOMY. EXPERIMENTAL
BACTERIOLOGICAL AND
CLINICAL STUDIES.**

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Introduction: Exacerbations of a latent pathological process like endocarditis, nephritis or polyarthrititis have been known to occur as a flareup directly following a tonsillectomy. Some cases have been described wherein new sites of the body, far from the tonsillar focus, may become involved (erythema multiforme or an icterus, etc.). A true septicemia due to a tonsillectomy is, on the whole, a very rare observation.

In seeking an explanation for these clinical observations, three possibilities may be considered: 1. there is a spread of bacteria from the tonsillar area into the blood circulatory system (a bacteremia or septicemia); 2. there is a resorption of endotoxins or exotoxins from the wound caused by the operative procedure (a toxemia); 3. there is an allergic response, due to the resorption of bacterial proteins which, upon entering the blood stream, act as "allergens." For the third theory one may refer to the work of Swift¹ and Klinge² concerning the pathogenesis of rheumatism. These investigators assume all rheumatic diseases to be nothing but "hyperergic" inflammation resulting from a sensitization to previous infection, regardless of the active organisms. It would be far beyond the scope of this article to discuss here all the various explanations offered by modern researches on allergy; as, for example, "para-allergy," biotropism and the like.

The most logical explanation appears to be that offered in the first theory; i.e., there is a spread of bacteria (bacteremia or septicemia) due to the operative procedure. That such a transient bacteremia can occur has been shown by some investigators but denied by others. On the basis of previous studies we conclude that such a bacteremia does occur even more often than described. We explain this as follows: 1. due to

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the lack of any clinical symptoms in the majority of cases, no blood examination was performed; and 2. due to the lack of rigid technique, contaminations appeared in the cultures, as has been admitted by many authors themselves.

The purpose of this article is to arrive at a bacteriological technique which would satisfy all the demands of asepsis and exclude decisively all contamination; therefore, it seemed to us necessary, first, to begin with preparatory studies of the various culture media, both from the standpoint of bacteriology and animal experimentation. Following this, we proceeded to actual clinical studies dealing with the question of whether or not a bacteremia occurs directly after tonsillectomy, and whether or not this bacteremia can be blamed for the flareups (endocarditis, polyarthrititis, nephritis, etc.) sometimes observed following this operative procedure. Before attempting the discussion of our studies, a short review of the literature of the subject in question seems opportune.

Literature: The earliest examinations for bacteremia were done by surgeons and obstetricians (Schottmüller,³ Seifert⁴). Seifert examined 300 cases where surgery was done and found a bacteremia present in 45 per cent of those cases. He stated that further examinations, with improved bacteriological technique, would undoubtedly reveal a still higher percentage of positive blood findings.

The first examinations from the laryngological side could not substantiate these facts.

M. Rubin, M. Epstein and M. Werner,⁵ in 1929, examined the blood of 78 children following tonsillectomy; none of them yielded positive blood findings.

H. Schwarz and J. A. Frisch⁶ found three cases of bacteremia among 11 children after tonsillectomy.

F. H. Bartlett and J. S. Pratt,⁷ in 1931, noted four positive blood cultures in 64 cases of tonsillectomies done upon children.

E. Wirth,⁸ in 1932, could find no single case of bacteremia among 45 patients.

J. Fischer and F. Gottdenker⁹ (1935) examined 51 cases of adult tonsillectomies. Of these, 16 individuals gave posi-

tive pure blood cultures from specimens taken two hours postoperatively. Blood taken 12 to 24 hours postoperatively was sterile again.

H. Roloff¹⁰ (1936) reported four positive blood cultures in 78 cases.

R. Mittermaier¹¹ (1937) confirmed the work of Fischer and Gottdenker by determining a similar percentage of positive blood cultures and also a similar type of bacterial flora in the cultures.

H. Southworth and C. Flake¹² (1938) investigated 22 cases, seven of which showed positive blood findings.

The contradictory evidence encountered in reviewing the literature is amazing. The conflicting reports may possibly find explanation in one or both of these: 1. either bacteriological studies require more careful and painstaking technique; or 2. the time chosen for obtaining blood specimens should be confined to within two hours after operations. Our previous examination⁹ showed blood taken at other times to be negative.

With regard to the technique, some of the authors frankly admit they could not avoid contaminations. Bartlett and Pratt, for example, state: "A considerable number of blood cultures had to be discarded because of contamination," or "the method used involves a great deal of handling, and perhaps a high percentage of contamination is inevitable."

Wirth considers many of the findings to be contamination since they were distributed equally among all blood tests; *i.e.*, they were not found more often nor in greater number in blood taken right after operation than in blood taken later; furthermore, they were also found in blood examined prior to the operation.

Southworth and Flake observed, "The technique employed necessitated such frequent subcultures (a total of 123 flask openings during the investigation) that the risk of contamination was unavoidable." They also state, "It cannot be determined definitely whether there was a true bacteremia or merely contamination."

The great number of conflicting reports were for us the reason to further research work on a larger scale.

Our Present Investigations: Our present examinations* include the following points:

1. Comparative experimental and clinical studies of various blood culture methods.
2. Bacteriological examination of the blood directly after tonsillectomy.
3. Preoperative bacterial examination of the tonsils.
4. Postoperative bacterial examination of the operative field.
5. Control examinations of the blood following operations in the nasal regions.
6. Clinical studies, including indications for operation, operative procedure, postoperative course, sequelae and complications.

The present material comprises 285 cases in which blood cultures were made in order to compare various culture media; eight experiments on guinea pigs for purposes of testing the technique used; 64 cases of tonsillectomy, with blood cultures taken at various times; 18 control examinations using nasal cases; 64 bacteriological examinations of tonsils; and 64 bacteriological examinations of the wound cavity after operation.

Bacteriological Technique: 1. *Studies of Blood Culture:* Generally speaking, three types of media are used for blood culture; viz., a mixture of agar with the blood to be examined; the addition of blood to a liquid culture medium; and the addition of an anticoagulant (liquoid) to the blood so that the blood remains as a culture medium. The first method was described by Schottmüller and was later modified by use of various culture media, such as ordinary meat infusion agar; hormone agar according to Cole and Lloyd and Hunton; Douglas agar, and the like. By this method, various amounts of blood (0.25 to 1 cc.) are added to the agar culture medium, liquefied, brought to a temperature of 41° C. and then mixed very well. The test tubes containing the blood agar are next incubated at 37° C.

*This research work was done in the Institute for Experimental Pathology and Bacteriology of the University of Vienna (Dr. J. Rothberger) and in the Polyclinic of Vienna (Dr. H. Brunner).

The advantage of this method lies in the easy manner of differentiating contaminative saprophytes. The disadvantages are numerous; *i.e.*, technical difficulties, especially if the blood sample is obtained by a clinician unfamiliar with bacteriological technique. Also, there is some danger that bacteria will be destroyed because of the high temperature of the agar; and it is very difficult to mix the blood with partially solidified agar.

The other methods which employ liquid media are also unsatisfactory. Aside from the possibilities of contamination, the choice of a suitable medium is difficult. Some of the media commonly used are: nutrient bouillon with or without the addition of sodium citrate or a 1 per cent glucose broth. A total of 1 to 5 cc. of the blood is added to 50 to 100 cc. of the culture medium and then incubated at 37° C. Subcultures are made on suitable media 48 hours to five days after incubation.

We were not satisfied with the aforementioned methods. Although certain cases presented clear clinical pictures (endocarditis lenta, pneumococcal sepsis, etc.), the bacteriological results obtained with the previously mentioned methods were negative. We, therefore, tried to find a new culture medium.

a. Our Modification of the Culture Medium: After numerous examinations based on experimental animal work (to which we will refer later), we obtained a culture medium suitable for our purposes. This should be called a modification of the Rosenow medium.

Preparation of the Culture Medium: 1. To a litre of distilled water add 8 gm. of Liebig meat extract and then heat until the extract has completely dissolved. We then add 8 gm. of sodium chloride, 20 gm. of glucose and 50 gm of Witte's or Difco peptone. The medium is adjusted with 0.1 N sodium hydroxide to a pH of exactly 7.2. After filtering through paper, the mixture is sterilized for two hours.

2. Place several pieces of fresh calves' brain (carefully divested of meninges) into an Erlenmeyer flask of 100 to 150 cc. capacity. To this, add a few pieces of marble about the size of a hazelnut and sterile for two hours.

To each Erlenmeyer flask add 50 cc. of the bouillon; the resultant mixture is again sterilized for 30 minutes.

Technique: Under aseptic conditions, 10 cc. of blood is drawn into a dry, sterilized syringe and then transferred to one of the Erlenmeyer flasks. It is advisable to remove the old needle from the syringe and to replace it with another before transferring the blood into the medium, since some bacteria may have been picked up during the perforation of the skin.

After a 24-hour incubation period at 37° C., subcultures are made on nutrient bouillon, on glucose-brain-broth and on blood agar (Schottmüller). If the blood cultures are sterile, they should again be examined 48 hours later, three days later and five days later on subculturing.

b. Experimental Tests with the Media: Guinea pigs weighing between 400 and 450 gm. were injected with 1 cc. of a saline emulsion of a 24-hour growth of staphylococcus aureus hemolyticus or streptococcus viridans Schottmüller containing 1,000,000,000 bacteria. Five minutes and 30 minutes after an intravenous injection, 3 to 4 cc. of blood were obtained by heart puncture and were equally distributed among the following culture media:

1. On 5 per cent peptone-2 per cent glucose-brain broth.
2. On 1 per cent peptone bouillon with citrate added.
3. On addition to 0.5 per cent liquid solution.

After incubating for 24 hours at 37° C., subcultures were made on nutrient broth, on glucose-brain-broth and on blood agar (Schottmüller).

TABLE I.

Organisms Injected	Our Modified Culture Medium		Citratcd Glucose Bouillon		Liquoid Culture Medium	
	5 Min.	30 Min.	5 Min.	30 Min.	5 Min.	30 Min.
Staph. aur. hemolyt.	+	+	+	—	+	—
Staph. aur. hemolyt.	+	+	+	—	+	—
Staph. aur. hemolyt.	+	+	+	—	+	+
Staph. aur. hemolyt.	+	+	—	—	+	—
Strept. viridans.....	+	+	+	—	+	+
Strept. viridans.....	+	+	+	—	+	+
Strept. viridans.....	+	+	+	—	+	—
Strept. viridans.....	+	+	—	—	+	—

c. Clinical Studies on Culture Media: The examinations cover 295 cases in which blood cultures were made. A perusal

of Table II will readily point out the superiority of our modified culture medium.

TABLE II.

Clinical Diagnosis	Number of Cases	Results on Our Modified Medium		Results on Glucose-Broth- Citrate	
		Pos.	Neg.	Pos.	Neg.
Endocarditis lenta.....	80	54	26	32	48
Lobar pneumonia.....	75	62	13	40	25
Acute septic disease (strep.)	86	49	36	28	58
Acute septic disease (strep.)	53	32	21	28	25
Acute septic disease (gonoc.)	2	2	1	0	3

The superiority of the modified method may be explained as follows: the high concentration of peptone improves the culture medium and prevents clotting of blood. The bacteria present in the circulating blood are often facultative anaerobes; therefore, they grow with great difficulty (or not at all) in the first passage under the anaerobic conditions obtained with the citrated bouillon. We could prove this factor by making subcultures.

For instance, in many cases where the glucose bouillon or the Schottmüller plates remained sterile, growth occurred on the peptone-glucose-brain bouillon. With further transplants from this culture medium, the bacteria also grew under aerobic conditions.

Blood Tests After Tonsillectomy: 2. Bacteriological Examination of the Blood After Tonsillectomy: A total of 64 cases were examined. Blood specimens used for analysis were obtained from one of the cubital veins. The blood was drawn under strict asepsis and in volume ranged from 5 to 10 ml. The blood specimens were obtained just preceding the operation, just after the operation, two hours postoperatively, and 12 to 24 hours postoperatively.

Indications for tonsillectomy were rheumatic complaints in 32 instances; frequent sore throat in 29 cases; latent endocarditis in two cases; and nephritis in one case.

The *age* of the patients was 16 to 30 years in 41 cases; 30 to 40 years in 17 cases; and 40 to 60 years in six cases.

Distribution according to *sex* was 28 males and 36 females.

The *time of operation* was in the interval between attacks. The period between operation and last acute inflammation was three to six weeks in four cases; six to eight weeks in 18 cases; two to 12 months in 34 cases; and more than a year in eight cases.

Operating technique followed our usual procedure. Anesthesia was induced locally with 1 per cent novocaine. In 44 cases the operative procedure took a normal course, but in 14 cases adhesions were found between the tonsils and the surrounding tissue. In four instances a tampon was sewed into the wound cavity, and in two cases we found it necessary to ligate large vessels within the tonsillar niche.

Fifty-five of the cases ran a normal course *postoperatively*; nine cases showed a rise in temperature to 100.5° F., and in two patients we encountered exacerbation of old rheumatic conditions, one of these mild, the other severe.

The results of the bacteriological examinations were as follows: of the 64 cases operated on for tonsillectomy, 21 yielded pure cultures from the circulating blood.

Table III reveals the various types of bacteria found in the positive growths:

TABLE III.

Organisms Found	Number of Cases
<i>Streptococcus hemolyt.</i>	8
<i>Streptococcus nonhemolyt.</i>	1
<i>Pneumococcus X</i>	1
<i>Staphylococcus hem. aur.</i>	8
<i>Staphylococcus nonhem. aur.</i>	3

In all instances, without exception, we found positive blood cultures only in those specimens which were taken two hours after the operation. Those blood specimens which were obtained 12 to 24 hours after operation failed to reveal any organisms. Similarly, all blood cultures taken before the operation proved sterile. These findings are the best proofs that we had no contaminations.

3. *Preoperative Bacterial Examination of the Tonsils:* With a sterile swab, material was obtained from the tonsils and

plated or streaked on nutrient agar, methemoglobin agar (Voges) and hemoglobin agar (blood agar Schottmüller). After 24 hours, the plates were very carefully examined.

Of the 64 tonsillectomy cases, 57 cases yielded mixed cultures, while seven cases revealed pure cultures of streptococci. A differentiation of the predominating types of bacteria noted in the mixed cultures showed streptococci to be present in 25 instances; staphylococci in 19 instances, and in 13 cases we were unable to differentiate the predominating bacteremia at all. In correlating the bacteriological findings in the blood and in the tonsils we observed that in 57 cases with mixed cultures from the tonsils, 15 yielded positive blood cultures as well.

Bingold¹³ states that in cases of mixed infection, only the true organisms will spread into the blood. We were not able to confirm this finding since we could not find a regularity or agreement between the predominating types as the tonsils and the types seen in the blood stream. In the seven cases where the tonsils yielded pure cultures of streptococci, four gave negative blood cultures, and three cases yielded positive blood findings. While two of the positive cases showed identical bacteria in tonsils and blood, one case showed no such agreement.

4. *Postoperative Bacterial Examination of the Operative Field:* With a sterile swab, material was obtained from the field of operation and plated or streaked on nutrient agar, methemoglobin agar (Voges) and hemoglobin agar (blood agar Schottmüller). After 24 hours, the plates were very carefully examined. The results obtained were as follows: complete sterility in six cases, pure cultures of streptococci in five cases, and mixed infection in 53 cases. Correlation of these findings with the blood findings failed to give better results than those we found with the tonsil examination.

5. *Control Examinations of the Blood Following Operations in the Nasal Regions:* In 18 cases, nasal operations were performed such as: Submucous resection of the septum, extraction of polypi, resection of turbinates, Caldwell-Luc operations, radical operation of the ethmoid, etc. Only two cases gave positive blood findings. In one instance an endonasal ethmoid operation was done; here, the blood culture revealed a nonhemolytic staphylococcus. The other case was

operated upon for a submucous resection of the septum; here, the blood culture revealed a nonhemolytic streptococcus.

6. *Results of the Clinical Studies:* A total of 64 cases was seen. Of these, two experienced exacerbation of old rheumatic conditions following operation. *Case 1:* A female, white, age 32 years, had complained of repeated rheumatic attacks for many years. Immediately after the tonsillectomy the patient felt terrific pains in all joints, experienced a rise in temperature to 100.5° F., and showed a swelling of the left wrist joint. The blood culture revealed a transient bacteremia with nonhemolytic streptococci. *Case 2:* The second case ran a milder course. This patient was a female, white, age 28 years, with a history of rheumatic attacks. Directly after operation, she complained of weakness, malaise and marked pains in all the joints. There was a slight rise in temperature to 100.1° F., but local joint swellings were absent. The blood culture revealed a transient bacteremia with nonhemolytic streptococci.

The majority of the other cases ran a normal postoperative course. Of these, 55 showed no irregularity, while seven patients experienced slight rises in temperature, between 98.7° and 100.5° F. We may conclude that in the majority of cases the transient bacteremia has no influence upon the clinical course, as evidenced by lack of symptoms. This will be discussed later in the article. Interesting and instructive were the results obtained in those cases where positive blood findings were correlated with the condition of the patient during the operation. In 44 cases, the tonsillectomy was performed without technical difficulties, 14 cases showed marked adhesions between tonsils and the surrounding tissue, and in four cases it was necessary to sew a tampon into the wound cavity. In two cases we were compelled to ligate large blood vessels within the tonsillar niche.

In the 14 cases with adhesions, nine revealed positive blood cultures, thus giving a 64 per cent transient bacteremia due to tonsillectomy. Of the four tamponade cases, two yielded positive blood findings. One of the two ligation cases showed positive blood culture.

In the remaining 44 cases which ran a normal course, only nine cases revealed some positive blood cultures. This means an approximate 20 per cent positive findings.

In comparing the results thus obtained we have, therefore, shown that while so-called normal tonsillectomies yielded only 20 per cent positive bloods, those cases which required more extensive local manipulations actually revealed positive blood findings well over 60 per cent.

What is the clinical importance of the transient bacteremia due to tonsillectomy?

First of all, one must be warned not to confuse a transient bacteremia with the clinical picture of a septicemia or a septicopyemia. In the latter instances there are generalized symptoms with the predominating clinical pictures of blood infection.

The septicemia is caused by a permanent or frequently repeated invasion of bacteria. In the conflict between invading bacteria and the bodily resistance, the patient faces an almost insurmountable obstacle. In direct contrast, the bacteremia is a transient condition due to a short primary invasion of bacteria, which in most cases has no effect upon the clinical picture. The bactericidal powers of the blood and the properties of the reticuloendothelial system act not only as preventives to the growth of bacteria but also assist in destroying them. Whether the invasion of bacteria depends on the number or the virulence of the organisms has not been decided as yet. It is clear, however, that the resistance of the body, the local conditions found in the region of infection and the type of operation all greatly influence the clinical picture.

Tonsillectomy is a surgical procedure performed in an unsterile operating field. The relative high percentage of the transient bacteremia may be due to the peculiar histological structures of the tonsils, their rich blood supply and the coarse dissection, during which contusions and lacerations cannot be avoided.

Our examinations have demonstrated that the number of positive blood findings was relatively higher in those cases where considerable local manipulations (ligation, tamponade, etc.) were necessary. There is no doubt that the danger of bacteremia is increased if a shorter interval of time between acute attacks is noted. Howard C. Ballenger¹⁴ found a transient bacteremia in acute throat infection. The practical consequences derived from our observations lead us to conclude

that an operation should not be performed too soon after an acute attack, and that one should operate gently, avoiding any forceful tearing of tissue. Also, a tonsillectomy should not be performed on patients with poor general health and diminished resistance.

We will not conclude this article without again emphasizing that the bacteremia following tonsillectomy is a short, transient affair, which, in the majority of cases, has absolutely no clinical significance. There are some exceptions, however, where special predispositions, like lowered body resistance, may initiate an exacerbation of an old latent process (polyarthritis, nephritis, endocarditis).

SUMMARY.

1. In 30 per cent of cases, tonsillectomy is followed by a transient invasion of bacteria into the blood.
2. The climax of the invasion may be observed two hours postoperatively; within 12 to 24 hours the blood is entirely sterile.
3. The incidence of bacteremia is noticeably increased with coarse dissection, with contusions and with laceration of the surrounding tonsillar tissue, or whenever local manipulations like ligation or tamponade are necessary.
4. The transient bacteremia should, under no condition, be confused with a clinical picture of septicemia or septico-pyemia.
5. The transient bacteremia after tonsillectomy has no great clinical significance. In the majority of cases the bacteremia disappears without having given symptoms.
6. Only in exceptional cases of predisposition, *viz.*, in a lowered body resistance, may one observe exacerbation of an old latent process following the invasion of bacteria into the blood.
7. The practical consequences which have been concluded from these bacteriological and clinical studies follow:
 - a. Operative procedure should, if possible, avoid unnecessary coarse tearing or manipulation of tissues.

b. The time of performing a tonsillectomy should be chosen with care. It should not be attempted too soon after the last attack of acute inflammation.

c. The operation should be avoided in patients with markedly lowered resistance of the entire body.

BIBLIOGRAPHY.

1. SWIFT: *Jour. Exp. Med.*, p. 497, 1924.
 2. KLINGE: *Ergebn. d. Pathol.*, 27, Berlin, Springer, 1933.
 3. SCHOTTMUELLER, H.: *Munch. med. Wchnschr.*, p. 557, 1911, and p. 1311, 1933.
 4. SEIFERT, E.: *Arch. f. klin. Chir.*, 138:565, 1925.
 5. RUBIN, M. J.; EPSTEIN, J. M., and WERNER, M.: *Amer. Jour. Dis. Child.*, 38:726, 1929.
 6. SCHWARZ, H., and FRISCH, J. A.: *Amer. Jour. Dis. Child.*, 38:1282, 1929.
 7. BARTLETT, H., and PRATT, J. S.: *Amer. Jour. Dis. Child.*, 41:285, 1931.
 8. WIRTH, E.: *Deutsch. med. Wchnschr.*, 58:1755, 1932.
 9. FISCHER, J., and GOTTDENKER, F.: *Monatsschr. f. Ohrenheilk.*, 69:1420, 1935.
 10. ROLOFF, H.: *Hals., Nasen. u. Ohrenarzt*, 27:274, 1936.
 11. MITTERMAIER, R.: *Monatsschr. f. Ohrenheilk.*, 7:316, 1937.
 12. SOUTHWORTH, H., and FLAKE, C.: *Amer. Jour. Med. Sci.*, 195:667, 1938.
 13. BINGOLD: Bergmann-Stachelin *Handb. d. inn. Med.*, 1924.
 14. BALLENGER, H. C.: *Arch. Otolaryngol.*, 20:452, 1934.
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TUBERCULOSIS OF THE TONGUE.

DR. H. P. SCHUGT, New York.

Only a small number of cases of primary tuberculosis of the tongue have been recorded in medical literature. The disease is rare and usually it is secondary to a tuberculosis elsewhere in the body. Until 1930, not more than 400 cases had been published. Lupus of the tongue is even less common than tuberculosis. Strandberg found only 16 cases of tongue lesions in 2,000 patients with lupus. Some authors believe that the muscular structures of the tongue form a certain protection against infection with the tubercle bacillus, and that it has a high immunity against mixed bacterial infections. In spite of the rare occurrence of tuberculosis of the tongue, the disease is of interest to the clinician because it is occasionally mistaken for carcinoma.

The incipient lesion is usually a single one, but may be multiple. Often the first sign is a painless nodule which subsequently breaks down and gives rise to the formation of a number of nodules or tubercles in the surrounding tissues. These form small ulcerations, and in some cases one sees only a rhagada or a slit-like ulceration, which at first may not be very painful and, therefore, is not always noticed by the patient. These lesions, especially when there are several, present a picture similar to what is described as grooved tongue; shallow ulcerations on the dorsum of the tongue resemble what is known as *lingua geographica*. As the infection progresses, pain sets in, and examination with a probe or a tongue blade reveals lesions much deeper than first suspected on superficial inspection. Often 0.5 cm. or more deep, these rhagadae are filled with a yellow-greenish secretion and show an irregular ulcerated margin. Tubercle bacilli may be found in the depth, and a biopsy will show the true nature of the ulceration. In the later stages, when several adjacent lesions merge, a large ulcer forms and at this time the patient complains of more or less severe symptoms, especially pain which is spontaneous and more pronounced while eating. There may be pain referred into the ear, or an area near

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the ear. This, however, is not always present and is not as pronounced as the referred earache in cases of laryngeal tuberculosis. This pain is explained by the connection of the lingual with the auriculotemporal nerve and its branches to the ear canal and drum. In the more advanced cases which I have seen, the ulcerations involved the entire tip of the tongue. They may be found on the entire lateral aspect of the tongue and occasionally reach from the tip to the base. The color is a dirty yellow or grayish, with irregular borders and quite tender to the touch. It is needless to say that in such stages of the disease the pain in the tongue becomes almost unbearable and largely contributes to the rapid failing of the patient. Small, isolated ulcerations at the base of the tongue are not always painful and, therefore, may not readily be noticed. When they involve a larger area of the base, severe pain becomes the outstanding symptom; occasionally such lesions are seen in conjunction with a simultaneous laryngeal involvement, which makes swallowing extremely difficult. In such advanced cases one may find a combination of superficial ulcerations with infiltrations of the entire body of the tongue, so much so that the tongue appears very swollen, edematous, and feels hard and knobby on palpation. The more superficial lesions show very little induration at the margin and do not bleed easily, in contrast to carcinomatous lesions. Enlargement of regional lymph glands is rarely seen, although the tuberculous lesion may be quite extensive. Even with small carcinomatous lesions, the motility of the tongue appears decreased, whereas in advanced tuberculosis the patient can freely move his tongue. This is explained by the fact that, contrary to carcinoma, the tuberculous infiltration is soft and stays superficial for a long time.

The diagnosis can usually be made without difficulty by its occurrence with cases of pulmonary tuberculosis, by the lack of induration around the ulceration, and by microscopical examination and biopsy.

Treatment: Very small ulcerations often respond to local medical treatment with high concentrations of silver nitrate, lactic acid, trichloroacetic acid, etc. Gentian violet has proved to be very effective in all kinds of tuberculous lesions of the oral cavity and the larynx. It destroys the always present mixed infection in the diseased tissue and thus actually

relieves the pain and greatly contributes to the further healing of the ulceration. These local measures can be combined with ultra-violet radiations (Kromayer lamp), applied directly to the lesion. Isolated ulcerations in patients with negative sputum, with a more benign pulmonary focus and good general resistance may be surgically excised or cauterized with the hot platinum needle, as is commonly done in laryngeal tuberculosis. Complete cures have been observed in such smaller lesions. Some authors, however, warn against surgical excision because of the danger of spreading the infection into the surrounding tissues. The more superficial ulcerations also respond to application of carbon dioxide ("dry ice"). A piece of it is held with a forceps and firmly pressed against the lesion for about 10 to 20 seconds. It is necessary to use some force so that the frost penetrates somewhat into the surrounding healthy tissues, which are not deleteriously affected by the dry ice. This treatment can also be used for ulcerations of the soft palate and pharynx. I have seen small lesions disappear entirely by this form of treatment, and with it the annoying pain. In laryngeal tuberculosis this method is difficult to apply because of the tendency of the ice to melt and form fumes when used in a warm, closed cavity. When there is edema of the tongue, intravenous administration of calcium gluconate on three subsequent days has proved beneficial. It also has an effect on the pain, as I noticed in advanced cases of laryngeal tuberculosis. Lately, good results were reported in intestinal tuberculosis when treated with large doses of calcium gluconate. Local application of orthoform or anesthesin powder, euphagin tablets, alypin and cocaine solutions may be recommended for temporary relief in painful lesions.

Unfortunately, in very widespread lesions the severe pain persists in spite of all efforts. If the ulceration involves the side and the tip of the tongue, blocking of the sensory (lingual) nerve on the diseased side is necessary. This nerve supplies the anterior two-thirds of the tongue. The nerve can be felt as a cord, the size of a match stick, just internally to the pterygomandibular ligament, below and behind the last molar tooth, under the mucous membrane. Whether the needle has struck and entered the nerve stem is confirmed by the immediate paresthesia felt in the tongue. Alcohol (80 to 90 per cent) is used for anesthesia. When I first tried this

method I was not very enthusiastic about it, but after a little more experience I obtained good results in a number of cases. Has the tuberculous process, however, spread from the tongue to the floor of the mouth, the nerve may not be distinctly located, and resection of the nerve from the outside is the procedure of choice. This operation is stood well by patients who are not too debilitated. These two methods, blocking or resection of the lingual nerve, may also be used in cancer of the tongue with severe pain. This intraoral method of blocking the lingual nerve is preferable to the other more widely known method of injecting the parent stem, the mandibular nerve, because it preserves the sensibility of the lower lip, cheeks and lower teeth (Skillern). I have never seen any unfavorable effects from either blocking or resecting the nerve.

Small lesions at the base of the tongue respond to the same treatments as outlined for those on the anterior two-thirds of the tongue. In large and deep ulcerations of the posterior portion, pain again is the chief complaint, especially if there is also present an advanced involvement of the larynx. In cases with negative sputum and moderately advanced pulmonary tuberculosis, electrocauterization is always indicated and may bring about healing. In deleterious cases with definitely bad pulmonary prognosis, the local treatment is far more difficult and less promising than in cases with lesions of the anterior two-thirds of the tongue. While all the previously described treatments may be used, the alleviation of pain in the posterior tongue remains an even more distressing problem than in lesions of the anterior part of the tongue. There is no known method that can definitely produce a lasting anesthesia of the base of the tongue alone which is supplied by the glossopharyngeal nerve. Resection of this nerve should be recommended if the pain is severe enough to warrant it.

Conclusions: Tuberculosis of the tongue is usually found in patients with a pulmonary focus and is to be considered a bad prognostic sign, although spontaneous cures have been observed even in extensive tuberculous lesions. An outline of treatment as used by the author has been described in detail.

122 East 76th Street.

CONGENITAL CYST OF THE EPIGLOTTIS. REPORT OF A CASE.

DR. THOMAS M. IRWIN, Orlando, Fla.

In Orton's review of material abstracted during the year 1939 on diseases of the larynx, he refers to the work of New and Erich in regard to congenital cysts of the larynx. It is stated by these men that congenital cysts of the larynx are of interest to the laryngologist primarily because of their extreme rarity. Of the 722 cases of benign laryngeal tumors encountered at the Mayo Clinic prior to 1938, only 35 were cases of cysts, and but one was the cyst of embryonic origin.

According to Jackson, 61 cases of cysts of the larynx have been seen by him: 33 males, 28 females. The youngest patient was a newborn infant with impending asphyxia from a congenital cyst on the anterior surface of the epiglottis. Recently the writer had the good fortune of seeing such a case and successfully removing the cyst in a child age 1 month.

Case History: B. P., colored infant, was brought to me for examination by Dr. E. Hitchcock, pediatrician, who was asked to see the baby because the mother had difficulty in nursing the child from the time of delivery; however, it was not until the infant was two weeks old that the parents consulted a physician, who said the baby had bronchitis, and this accounted for the "crowing sound" which was audible when the child would breathe. Not satisfied with the result obtained, the child was brought to the pediatrician mentioned above, who detected the laryngeal stridor and noticed the respiratory effort of the patient.

The baby was slightly under weight, afebrile, colored. It had been breast-fed from birth and the feedings had become more and more difficult. When the baby was lying quietly in its mother's arms, with the head elevated, there was no pronounced respiratory distress, but respirations were rapid, and the breathing was audible several feet from the infant. The cry was feeble and hoarse. Any excitement caused an exaggeration of all symptoms and marked respiratory embarrassment.

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ment manifested by a suprasternal retraction, "tracheal tug" and abdominal breathing.

Attempts to open the mouth resulted in choking and cyanosis; however, a large pale mass could be seen in the oral pharynx looking not unlike a choanal polyp. The mass completely filled the oral pharynx and pushed the soft palate and uvula forward and upward. It could not be determined from this first examination whether the cyst was attached to the pharynx or was coming from the larynx. By digital examina-

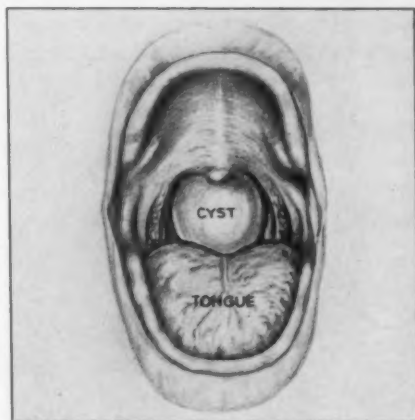


Fig. 1. Cyst seen in mouth of infant 1 month old.

tion the growth was found attached to the anterior surface of the epiglottis. Immediate removal was advised in view of the respiratory embarrassment.

A light ether anesthesia was started, but this only added to the patient's difficulties and was discontinued. Attempt to visualize the cyst by direct laryngoscopy and subsequent attempts to remove the growth by snare were not successful, and on one occasion the breathing stopped. It was necessary to give oxygen and artificial respiration. It was then decided to open the sac and allow it to collapse. A small nick was made in the thin wall and approximately 4 cc. of clear, straw-colored fluid was liberated under pressure with the infant held in the "head low" position. The sac was then removed in several pieces. There was a minimum of bleeding. The

postoperative course was uneventful with the exception of a slight respiratory infection which lasted approximately three days. Direct examination of the larynx three weeks after removal showed no evidence of recurrence. The baby's nursing ability is that of any normal infant, and she is gaining steadily.

The pathological examination of the sac showed several small pieces of irregularly-shaped tissue. The stratified columnar epithelium is thin and flattened. Occasional fibroblasts are seen but no marked fibrosis. The glandular acini are small but numerous.

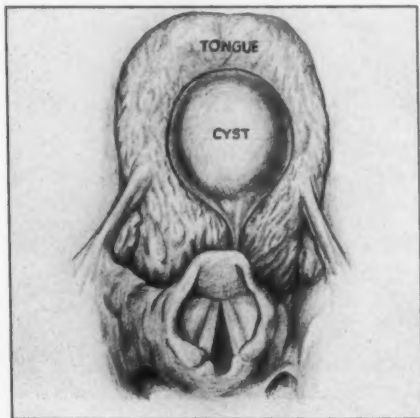


Fig. 2. Cyst attached to anterior surface of epiglottis, as viewed by direct laryngoscopy.

CLASSIFICATION OF CYSTS OF THE LARYNX.

Jackson classifies cysts of the larynx in the following manner: 1. glandular; 2. connective tissue; 3. pseudocysts.

The glandular cysts are lined with somewhat changed glandular acini and ducts; they may be cystic adenoma or retention cysts. The epithelium is somewhat flattened, and more or less fibrous tissue is found in the wall of the cavity. The content may be clear and quite fluid or cloudy, grayish and very thick.

The connective tissue cyst is produced by localized diffusion of serum beneath the epithelium and stroma, producing

a distinctly tumor-like form. In some cases there is an effusion of serum into the stroma which contains more or less fibrous tissue. The contents of this type cyst may be the same as the glandular type.

Pseudocysts is the name applied to those where there has been an effusion of serum under the entire mucosa, so that it is raised up into a tumor-like form.

New and Erich classify cysts of the larynx as: 1. mucous; 2. hemorrhagic; and 3. congenital.

Embryonic cysts of the larynx are genuine neoplasms. A microscopic examination of the wall of the congenital cyst which was removed by New and Erich revealed a lining composed of stratified columnar epithelium containing mucous glands, whereas the subepithelial tissues were markedly infiltrated with lymphocytes. These authors further state that these tumors need not be present necessarily at birth. Some of them are first apparent in persons who have reached adult life; however, if small, these cysts may exist for many years without producing any noticeable symptoms.

SUMMARY.

1. Report of a case of a congenital cyst of the epiglottis in a colored female, age 1 month.
2. Such growths should be considered, though rare, and looked for in infants who show respiratory distress and nursing difficulties.
3. Removal of the cyst in its entirety appears to be the treatment of choice.

BIBLIOGRAPHY.

1. ORTON, H. B.: Disease of the Larynx. Material Abstracted During the Year 1939. *THE LARYNGOSCOPE*, Vol. L, Feb., 1940.
2. NEW, G. B., and ERICH, J. B.: Congenital Cysts of the Larynx. *Arch. Otol.*, 30:6:943-949, Dec., 1939.
3. JACKSON, C., and JACKSON, C. L.: The Larynx and Its Diseases. W. B. Saunders. 1937.

INJURIES OF THE LARYNX; TRAUMATIC AND THERAPEUTIC.*

DR. JOHN D. KERNAN, New York.

It is well understood that owing to its structure the larynx is subject to stoppage of its lumen in the face of acute infections. The tissues liable to swell are those composing the ary-epiglottis folds and the cornus elasticus below the vocal cords. Unless they result in death of the patient, these infections as a rule speedily resolve.

Chronic infections, such as syphilis, tuberculosis, scleroma, also cause laryngeal obstruction of a much slower evolution. If the disease can be controlled, the function of the larynx will be restored. That is, unless in the course of the acute or chronic infection the perichondrium or cartilaginous structures of the larynx are injured. Then will ensue a form of productive inflammation which, slowly advancing, will perhaps years later obstruct the larynx. The pathological process results in the production of a dense fibrous tissue (slide) which may finally fill the airway. It matters not at all whether or not the injury to the larynx comes from disease, trauma or therapeutic attempts, surgical, medical or Roentgenological, to control the disease, once the process is started the case pursues the same course.

In order to limit my paper, I shall not touch on those cases due to disease, but only those cases due to some form of external violence. When I sent in this title, I was informed that I must have made a mistake. How could there be therapeutic trauma to the larynx? I hope to show you by reporting a few cases.

The first patient, a woman, age 42 years, was admitted to the Presbyterian Hospital, Dec. 16, 1939, giving this history: Thirty years before admission, when she was 12 years of age, she had diphtheria, for which a tracheotomy was done. She could not be extubated after recovery, and wore the tube for five years. Then, after treatment at various hospitals, the tube could be removed. She was in good health till 15 months before admission, when she had a fall on her face. Shortly after, dyspnea developed, which progressed till very severe. Examination

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externally showed that the tracheotomy had been done through the lower part of the thyroid cartilage. The central portion appeared to be missing. Examination of the larynx with a mirror revealed only greatly swollen arytenoids, which concealed the lumen. When a direct examination was done it was seen that the whole interior of the larynx was occupied by a dense mass of fibrous tissue which obliterated all normal landmarks.

Treatment of this case was as follows: A new tracheotomy was done, as low down as possible. Then a 22 French rubber core mold was inserted. After a week an attempt was made to introduce a 24 F. core mold. This was not successful. Since then we have used increasing sizes of bougies up to 36 F. The woman is now able to breathe with her tube corked and will soon be extubated.

You will agree the placing of the original tracheotomy opening in the thyroid cartilage was therapeutic trauma. Of course, it may be said that the diphtheria started the chronic inflammation. Probably not, as the almost inevitable effect of a misplaced tracheotomy is stenosis of the larynx. An oversized intubation tube will do the same thing. The lesson to be learned is proper low placement of a tracheotomy tube.

Another case of therapeutic trauma. This woman, age 51 years, developed symptoms of thyrotoxicosis 18 years ago. She was treated by X-ray for three years, sometimes as often as three times a week, then for several years at less frequent intervals. The thyroid condition improved. She was well till two years ago, when she developed stridor and dyspnea. She also developed an ulceration of the skin, which has healed. During the past few weeks the dyspnea has developed so rapidly that she came into the hospital for treatment. The dyspnea was so urgent that a tracheotomy was done the day of admission.

Later a direct examination was done and the cause of the obstruction was found to be a fibrous stricture below the vocal cords. This has been easily stretched and she has been extubated. As you will see, the skin of her neck is much discolored and the subcutaneous tissue is densely infiltrated with scar tissue. She appeared when examined to have a double abductor paralysis. We contemplated doing an omohyoid transplant for this paralysis, but we realized that the chronic changes in the tissues of her neck were such that that procedure would be impossible.

Roentgen ray therapy has been greatly improved in the last 18 years. I doubt very much if we would find another case such as this under modern treatment. They were at one time more common. I can recall a case of carcinoma of the larynx which had been cured by radium. But the whole larynx sloughed out. It is on account of the danger of injury to the laryngeal cartilages that X-ray treatment is unsuccessful in advanced cancer of the larynx. To kill the cancer, the larynx is also injured. The result is a terrible perichondritis. We see a number of such cases.

Lest you think I am assuming a position of superiority, telling of other people's troubles, I am going to tell you one

of my own. A man of about 40 years had a large tumor on one vocal cord. It was suspected to be a carcinoma, although it sprouted out rather than infiltrated the tissues. A laryngofissure was decided upon, to be followed by a laryngectomy if focal removal seemed impossible. When inspected directly, it could be seen that the tumor was more like a papilloma than a carcinoma, so it was removed with an electric cautery and the wound closed. Then began a terrible two years. In a month the tissues in the larynx were so swollen that a tracheotomy was called for. Later the wound opened to discharge a fragment of dead cartilage. This it continued to do till eventually the whole thyroid cartilage was extruded. The wound then healed and the tracheotomy tube could be removed.

This experience helped me to understand the following case: An iron molder was ladling molten iron from one vessel to another. There was a slight explosion in the ladle, and a tiny fragment of the molten metal flew down his throat into his larynx. He at once experienced great pain. His larynx when examined half an hour later showed great redness, nothing more. In a few days he resumed work. Later, however, increasing dyspnea forced him to stop. Examination of the larynx then showed it to be filled with dense firm tissue. This was removed sufficiently to allow him to breathe. The histological picture was that of dense fibrous tissue. There was no destruction of cartilage here, perhaps because there was no trauma from operation. Note that in both of these cases, injury of the larynx due to heat, the symptoms developed slowly. The slow development of symptoms of obstruction is characteristic of the larynx.

This man had real external violence applied to his larynx. A month before his admission to the Presbyterian Hospital, Jan. 25, 1940, he fell out of a window and struck the lower part of his neck. At once there was tremendous swelling of the neck and chest. It was thought a lung was ruptured (X-ray). I think probably there was a compound fracture of the larynx, compounded inside. The air slowly absorbed and for a while he was comfortable, then dyspnea slowly developed; relieved once by coughing up of pus. In spite of this temporary relief he continued to have trouble breathing till he came to the hospital.

Examination with the mirror showed a greatly enlarged right arytenoid and aryepiglottic fold. Below that, inside the larynx, the lumen was almost closed by edematous tissue. A tracheotomy was decided upon. There was great difficulty doing this because the trauma and subsequent emphysema had caused much inflammation in the neck, obscuring the landmarks; moreover, there was considerable hemorrhage, hard to control. We had great trouble in finding the trachea. Finally, we had to pass a bronchoscope and cut down on that. Even then we could not get in till we located the bronchoscope by probing with a needle and cutting down along that.

Four months later, patient still wears his tracheotomy tube. There is edematous swelling in the larynx. I have no doubt that as this acute reaction subsides he will have a productive inflammation and obstruction by scar tissue. I think the treatment is correct. The tracheotomy relieves his breathing and holds him safe from strangulation. Resting his larynx will tend to limit the production of scar tissue. Later he will doubtless need further measures to open his airway.

Summary: I have quoted five cases of injuries of the larynx, one due to misplaced tracheotomy opening, one due to over-exposure to X-ray, two due to injury by heat, which was applied in one case therapeutically and in one accidentally, and one case of external violence. I could mention many others but these will suffice to emphasize the following points:

1. The response of the larynx to injury may be very slow, taking years to show its full effect.

2. The pathological process is the same in all; namely, the production of dense fibrous tissue.

3. The best treatment for acute traumatic cases is tracheotomy.

4. The necessity of the correct placing of the tracheotomy opening, and control of X-ray therapy are obvious.

5. Once the scar tissue has developed, it must be excised, or caused to absorb by the pressure of rubber tubes. Some cases may be treated with bougies.

103 East 78th Street.

TRAUMATIC PARALYSIS OF THE CRICOTHYROID MUSCLE.

DR. T. E. BEYER, Denver.

Paralyses of the cricothyroid muscle occur very rarely. In 1890, Creveling¹ reported the resection of the superior laryngeal nerve in two cases of spasmodic disease of the larynx. Presumably, these operations resulted in a paralysis of the cricothyroid muscles, but Creveling failed to describe the laryngoscopic picture. Mygind,² who reviewed the literature in 1906, found only 13 cases of cricothyroid muscle paralysis, to which he added four cases of his own. Recently, New and Childrey³ reported a case of superior laryngeal nerve paralysis resulting from arteriosclerosis.

There is no unanimity among observers on the syndrome of cricothyroid muscle paralysis. In view of the rarity of the condition, this is not surprising. Most observers are in full agreement that paralysis of this muscle results in a weak, toneless, monotonous voice, which is easily fatigued, but there is a wide divergence of opinion on the resulting appearance of the larynx. Semon,⁴ Chiari⁵ and Hajek,⁶ for example, found the paralyzed cord lower than its fellow; while Riegel,⁷ Neuman,⁸ Thomson⁹ and McKenzie¹⁰ found it higher. Bosse¹¹ noted a lack of vibration of the vocal cord, in contrast to McKenzie, who described movements of the paralyzed cord on inspiration and expiration. The oblique position of the glottis was first described by Riegel and later confirmed by Lublinsky¹² and Mygind. Flaccidity of the affected cord was noted by most of the observers.

The laryngoscopic findings resulting from cricothyroid paralysis seemingly vary and are often contradictory. The most detailed and probably the most reliable description is that of Mygind, who studied 17 cases.

Mygind found the obliquity of the glottis to be characteristic in unilateral cases. The anterior commissure is tilted oppositely to the paralyzed side. Due to a lack of tension, the paralyzed cord bulges upward on forced expiration and

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is drawn downward on inspiration like the flapping of a slack sail. On deep inspiration the vocal cords disappear from view under cover of the ventricular bands. Mygind's findings have been confirmed by the experimental work on animals by Kuttner.¹³

Report of a Case: Mr. H., a farmer, age 36 years, was involved in an auto accident on July 7, 1939. After regaining consciousness he noticed that, besides injuries of a minor character, there was a hole in his windpipe, through which he felt the air going in and out. This wound was sutured at the hospital and apparently healed by primary intention.

Patient's principal complaint now is that "he cannot call the hogs." Dust and dirt incident to his occupation irritate his throat, and he often awakens at night because of the dryness of his throat. He coughs but little, but has some difficulty in swallowing rapidly. Sometimes he feels a lump in his throat.

Examination on Dec. 12, 1939: Reveals a well developed, well nourished man who speaks with a husky voice. There is a scar, evidently resulting from a puncture wound, on the anterior left surface of the neck at the level of the cricothyroid membrane. From this point a thin linear scar extends to the left for about two inches. From the same point another thin linear scar extends across the cricoid for about two inches.

Examination of the hypopharynx and larynx reveals no anesthesia. The laryngeal reflex is actively present. The laryngeal mucosa is somewhat reddened but there are no secretions. The epiglottis and the action of the arytenoid cartilages appear to be normal. Both vocal cords have a pearly gray appearance. The left vocal cord is apparently longer than the right. It appears to be loose and flaccid. On inspiration, both cords and vocal processes disappear from view. On attempts to phonate, the ventricular bands approximate in the midline and completely hide the vocal cords. Apparently both vocal cords are in the same horizontal plane, but the difference in the length of the cords gives the glottis an appearance of obliquity. As much of the tracheal mucosa as can be seen by means of indirect laryngoscopy is apparently normal.

In view of the above history, symptoms and laryngeal data, the diagnosis of cricothyroid muscle paralysis of traumatic

origin appears to be well established. Mygind reported three similar cases resulting from suicidal attempts.

The prognosis as to the patient's voice seemingly depends upon whether the external branch of the superior laryngeal nerve was injured at its entrance into the lateral surface of the larynx or whether the injury was purely muscular. In the latter event, some restoration of function is still to be expected.

Vicarious adduction of the ventricular bands is an unusual finding. Chiari recorded a case associated with adductor paralysis in hysteria. In the case reported, the action of the ventricular bands is undoubtedly compensatory in character, the false cords taking over the function of the true cords, one of which is paralyzed.

Section of the external branch of the superior laryngeal nerves with a view of paralyzing the cricothyroid muscles has been suggested in the treatment of bilateral abductor paralysis. *A priori*, this appears to be both a logical and physiological procedure but, practically, the results have been disappointing.

BIBLIOGRAPHY.

1. CREVELING, J. P.: *Jour. A. M. A.*, p. 533, Oct., 1890.
2. MYGIND, HOLGAR: *Hospitaltid.*, 14:789, 1906.
3. NEW and CHILDREY: *Arch. Otol.*, 11:752, 1930.
4. SEMON, FELIX: Heymann's *Handb. d. Laryngol. u. Rhinol.*, Wien., 1:712, 1898.
5. CHIARI, O.: *Die Krankheit. d. Kehlkoph. u. d. Luftrohre*, p. 77.
6. HAJEK, M.: *Erkrank. d. Kehlkoph. d. Luftrohre u. d. Bronch.*, 1932.
7. RIEGEL, F.: *Deutsch. Arch. f. kl. Med.*, 7:204, 1870.
8. NEUMAN: *Berl. kl. Wchmschr.*, p. 141, 1891.
9. THOMSON, ST. CLAIR: *Dis. Nose and Throat*, p. 595, 1937.
10. MCKENZIE, MORRELL: *A Manual of Diseases of Throat and Nose*, 1:435 and 462, 1880.
11. BOSSE, H.: *Arch. f. kl. Chir.*, 13:243, 1872.
12. LUEBLINSKY, W.: *Munch. med. Wchmschr.* p. 1053, 1901.
13. KUTTNER, A.: *Arch. f. Laryngol. and Rhinol.*, 19:172, 1907.

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**OPEN SAFETY PIN IN STOMACH; REMOVAL BY
ENDOSCOPIC MEASURES ASSISTED BY
SINGLE PLANE FLUOROSCOPY.**

DR. E. LEE MYERS, St. Louis.

The removal of an open safety pin from the air or food passages is indeed difficult enough, but when the pin has reached the stomach the problem resolves itself into the following problems:

1. Can the pin successfully travel the rest of the way safely?
2. Should the stomach be opened and pin be removed by gastrostomy?
3. Are endoscopic measures safe for foreign bodies in the stomach?

To the first we may say that the possibility of an open safety pin traveling the entire distance safely is quite good; cases are on record where pins have been found in the diaper when the mother had not even missed the pin. M. C. Myerson¹ reports a series of 39 cases of foreign bodies in the stomach and intestine, in which only five were subjected to gastrostomy. One of these cases died; in two, the pins were not found; in the other two, the pins were recovered. The problem of deciding when to do a gastrostomy is summed up by Chevalier Jackson,² who states: "A few days or a week is long enough to wait, then steps should be taken to remove the pin by endoscopic means. He speaks in no uncertain manner as to the disadvantages of attempting this work guided by single plane fluoroscopy and recommends using the services of a Roentgenologist fully trained in the use of the double plane fluoroscope.

Surgical removal of the pin from the stomach in a very young child is considered quite dangerous; possibly in the hands of surgeons having great experience it can be done with few mortalities. Three of my cases, all very young, were successfully gastrostomized; one was a bolt in the duodenum, the other two were extremely large pins, one of which was

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caught in the pylorus. It seems a good rule to watch for colicky pains, give no cathartics, and fluoroscope daily to see if the pin is properly engaging (*i.e.*, entering pylorus with trailing ends); if not, surgical removal should be deferred until a good chance is given the endoscopist.

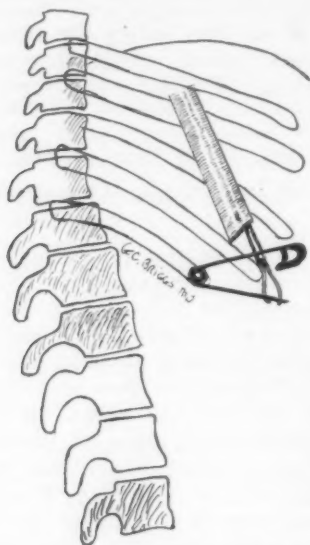


Fig. 1. Open safety pin lying loose in stomach. Numerous attempts to "hole" spring or hooded end failed; several times pin toggled; a grasp of pointed shaft permitted following two steps.

Removing a foreign body from the stomach by using a hollow tube, lighted either proximally or distally, has in my hands proved quite difficult. The immense amount of secretion, the folds of the stomach and one's inability to judge perspective all combine to make this work the *bete noir* of the endoscopist. As above stated, single plane fluoroscopy has its disadvantages in not giving one guidance in the lateral position.

The double plane fluoroscopes which we have used have also proven quite inadequate because of the lack of good definition in the lateral plane. It is unlikely that double plane fluoroscopy will be done frequently; 1. because of the rarity

of its need; and 2. the great cost of its specially constructed equipment, the latest of which has been modified by Dr. Chamberlain, of Temple University, for Jackson's Bronchoscopic Clinic.

The following case of an open safety pin in the stomach of a physician's niece posed a difficult problem: The pin was made of very stiff material and had failed to engage for

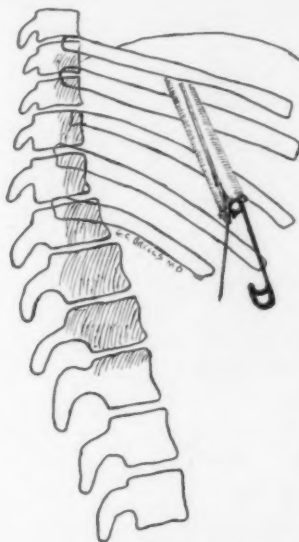


Fig. 2. The stiff rotation forceps was gently moved up to crotch between shaft and curl of pin; a certain amount of movement with tube mouth "jiggling"; pin was felt to engage in tube 8 x 5.5 mm.

48 hours. To gastrostomy there were decided objections. The question of removal by endoscopy was laid in my hands. A none too sanguine outlook existed in the absence of a modernized double plane fluoroscopy; however, the success of the case depended upon the resourcefulness of the Roentgenologist, Dr. Paul C. Schnoebelen, of the Jewish Hospital.

Case Report: Female child, age 2 years, minus 15 days. Child removed diaper pin herself while in sleeping bag; mother noticed her having difficulty in breathing, having some signs of cyanosis, which later disappeared. Immediate X-rays by Dr. Joseph Peden, of the Deaconess Hospital, showed the pin to be in the stomach. Fluoroscopy the following morning showed the pin to be unengaged; likewise, another fluoro-

scopic 24 hours later revealed the pin to be in the upper curvature of the stomach. There were no signs of colic, but considerable gas was present. On consultation, Dr. George Rendleman, Dr. Joseph Peden and Dr. Atherton decided upon the possible removal by endoscopic means rather than surgery or the "via naturale."

A duplicate of the pin proved the intruder to be made of heavy steel, 1.5 inches long, and the spread of the opening was estimated at seven-eighths of an inch. The child was narcotized with two small doses of nembutal, and an esophagoscope 5.5 mm. x 8 mm. x 40 cm. in length was introduced into the stomach. Our Roentgenologist immediately stated, "You are right on the pin." We were not; the illusion was caused because lateral definition was lacking. Several holds were had on the

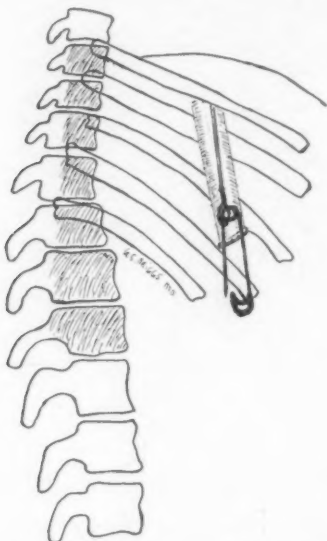


FIG. 3. Pin now in scope, a slight pulling motion practically closed pin. Removed with trailing ends.

pin; some were worthless. The orthodox removal was, of course, grasping the curl of the pin and bringing the pin upward and backward into the scope, thus closing the pin. Failing in this method, the keeper was grasped, but not in the hole, which would have permitted straightening the pin through the scope. At this point we recognized poor progress; Dr. Schnoebelen suggested elevating the head of the table until the pin was observed to move out of the cardiac end of the stomach and downward along the lesser curvature of the body of the stomach. This position allowed the pin to drop to a dependent portion of the stomach, and after several trials, still using stiff rotation forceps, we were rewarded by catching the pin in the crotch between the curl and the pointed shaft, which permitted our dragging the open pin to the mouth of the scope, and by using slight "jiggling" motions we were able by slow movements to partially close the pin in the stomach. From here on, the removal was without any difficulty.

The writer of this article makes no claim for originality in the manner in which this case was handled. The recording may help in some way in the solving of a similar problem.

REFERENCES.

1. MYERSON, M. C.: *Trans. Amer. Laryngol. Assn.*, May, 1928.
2. JACKSON, CHEVALIER: Discussion. *Ibid.*

207 Wall Building.

IN MEMORIAM

HERBERT TILLEY, M.D., F.R.C.S.,

1867-1941.

The passing of Herbert Tilley at his home on St. George's Hill, Weybridge Hill, England, Jan. 6, 1941, evoked profound regret, not only in the British laryngological profession but also to a large group of older American laryngological colleagues with whom he had such cordial contacts for many years.

He was born in Somerset, Jan. 6, 1867, was graduated M.D. from the University of London in 1890, and granted the diploma of F.R.C.S. in 1898. He was Consultant Surgeon to the Ear, Nose and Throat Department of University College Hospital; Laryngologist to the Radium Institute; President of the Medical Society of London, 1931-1932; Secretary of the Section on Laryngology and Otology of the British Medical Association in 1899, and was President of the Section on Laryngology at the London meeting in 1910.

With the establishment of a department for Diseases of the Throat and Ear at University College Hospital, he was appointed to take charge of it and his activities in this position were his greatest pride.

His special contributions were mostly in connection with Pathology and Surgery of the Accessory Sinuses of the Nose, much of which is embodied in the later edition of de Haviland Hall's book on Laryngology.

In 1934, Tilley gave a final exposition of his views on the pathology of sinusitis in a Semon Lecture which contained much original clinical observation and wisdom.

When Sir Felix Simon founded a Lectureship with funds subscribed by friends and colleagues, it was placed in the care of the University of London and was committed to the charge of Tilley. The reputation of this Lectureship has developed

to highest standards, due to his personal application to and upbuilding of it.

Tilley was an Honorary Fellow of the American Laryngological Association and personally known to many of its members. To those who had the privilege of this personal acquaintance he was a rare companion, a loyal and gracious colleague, a cultured gentleman and an understanding friend. He will always hold a place high in the esteem of his friends and colleagues for his graciousness, his helpfulness, his thoroughness in work and his substantial contributions to the development of laryngology.

M. A. G.

JOSEPH AUGUSTUS WHITE, M.D.,

1850-1941.

Dr. Joseph Augustus White, our esteemed nonegenerian of Richmond, Va., died Feb. 16, 1941.

He was born in Baltimore in 1850, was educated at Rock Hill Academy, Loyola College, Mount St. Mary's College and the University of Maryland, where he received his M.D. degree in 1869.

Dr. White was formerly Chairman of the Section on Ophthalmology of the American Medical Association; President of the American Laryngological, Rhinological and Otological Society, 1914; a member of the American Otological Society, Inc., and the American Laryngological Association.

As a loyal and active member of these Societies, he was a regular attendant at all annual meetings, even when well along in his eighties, and his genial personality and kindly contact with his colleagues will always be a pleasant memory.

M. A. G.

NEW YORK ACADEMY OF MEDICINE.

SECTION ON OTOLARYNGOLOGY.

Regular Meeting of April 17, 1940.

Sphenoiditic Hydrocephalus. Dr. Irving B. Goldman.

(To be published in a subsequent issue of THE LARYNGOSCOPE.)

DISCUSSION.

DR. GEORGE A. BLAKESLEE: In this valuable and interesting paper read by Dr. Goldman, entitled Sphenoiditic Hydrocephalus, it was my privilege to make neurological examinations and a study of one of the cases he described tonight. It was the case of the Chinese school boy, age 15 years, treated in Beekman Street Hospital.

Dr. Goldman has described the symptoms and mentioned some of the neurological signs in this case, but it seems to me that in a patient where the accurate diagnosis is of such importance for proper treatment, the complete neurological picture should be given, for the reason that the neurological findings may very readily lead to a diagnosis of encephalitis, brain tumor or brain abscess, with subsequent improper treatment. A resumé of the neurological study is as follows:

On Nov. 4, 1938, the day of admission to the hospital, the boy complained of headache, diplopia and lethargy. The pupils were unequal in size, there was a loss of light reflex, with preservation of accommodation. There was slight weakness of the left external rectus muscle. The fundus examination revealed rather large retinal veins. The superficial and deep reflexes were active and equal. There was a bilateral plantar reflex. The general sensory examination was negative. On Nov. 7 (three days after admission), the patient was conscious and co-operative, and in addition to the neurological signs present on the day of admission, there was a slight rigidity of the neck and a bilateral Kernig sign. Two days later, the sphenoid sinuses were operated and revealed a swollen mucous membrane. Pathological diagnosis was chronic sinusitis.

On Nov. 10 (six days after admission), in addition to the described neurological signs, there was a loss of convergence reflex, and nystagmus, lateral in direction toward the left and right. On Nov. 15 (11 days after admission), no change in the symptoms or neurological signs. Nov. 16 (12 days after admission), no change in the neurological signs, except a slight reaction of the pupils to light and convergence. The fundi were normal. Nov. 17 (13 days after admission), pupils reacted sluggishly to light but promptly to convergence. There was less rigidity in the neck. Nov. 22 (18 days after admission), following the use of sulphanilamide for the past five days, a slight elevation of temperature became normal. The only change in the neurological examination was a blurred outline in the upper nasal borders of the optic nerve heads. Nov. 23 (19 days after admission), this blurring had increased and there were two hemorrhages in the right fundus. On this date, it was advised that the sphenoid sinuses be reopened. On Nov. 29 (25 days after admission), the fundus examination revealed three diopters swelling of each optic nerve head. The hemorrhages in the right fundus were located about 9:00 and 12:00 o'clock, and were much larger in size. Nov. 30 (26 days after admission), no change in the neurological signs. A suggestion was made of the possibility of brain abscess, and it was recommended that there be a neurosurgical consultation. It was also suggested that there might be an osteomyelitis of the basisphenoid bone. On Dec. 2 (28 days after admission), there was a diminution in swelling of the optic nerve heads. Dec. 6 (32 days after admission), the pupils reacted promptly to light and convergence. There was less papilledema.

There was less paralysis in the left external rectus muscle, less rigidity of the neck, and a note was made that the patient seemed to be convalescing. Dec. 7 (33 days after admission), the fundus examination revealed a slight haziness about the disc, and the hemorrhages were smaller in size. There was no rigidity of the neck and only a slight Kernig sign. There was no complaint of headache. Dec. 14 (40 days after admission), the patient's only complaint was diplopia on looking toward the left. The neurological examination was negative, with the exception of very small hemorrhages in the right fundus. The patient convalesced rapidly and was discharged from the hospital, Dec. 28 (54 days after admission), with the solitary complaint of double vision on looking toward the extreme left.

The symptoms and neurological signs in this patient were those of an organic neurological disease, and the neurological diagnosis made was encephalitis or possibly an expanding disease such as brain tumor. The very important lesson learned is that, with symptoms and signs of an intracranial disease of the nervous system, the focus of disease was located in the sphenoid sinuses, with resultant signs of a neurological disease. The surgical therapy used by Dr. Goldman, with frequent spinal fluid drainage, resulted very happily in complete recovery.

Regarding the hydrodynamics of the cerebrospinal fluid, and this is of much importance in explaining the neurological signs and symptoms in this disease, Dr. Goldman has suggested this can be altered by a toxic focus with resultant hypersecretion and defective absorption and thus cause an internal hydrocephalus. He has quoted the theories of others as possible causes of hydrocephalus. One more theory may be suggested as a cause of internal hydrocephalus of the communicating type in sphenoiditic hydrocephalus. With the suppurative infection in the sphenoid sinuses, may there not be a periostitis of the wall of the sinus with reactive edema of the dural membrane? It is to be recalled that the meningeal lymphatics communicate directly with the sphenoid sinus lymphatics. The very close proximity of the sphenoid bone to the lobus frontalis inferior, in association with the edema, may give a localized mechanical obstruction and increased cerebrospinal fluid pressure. The veins within the calvarium, which have the lowest pressure of the intracranial components, then receive additional pressure of the increased cerebrospinal fluid, with resultant decreased absorption.

As a possible explanation of the neurological eye signs, it is to be recalled that the third, fourth, sixth, and ophthalmic divisions of the fifth, lie just above the sphenoid bone, before their entrance through the supraorbital fissure to the orbit. May there not have been direct pressure upon these cranial nerves just above the sphenoid bone or, if not, possibly there was indirect pressure due to the communicating internal hydrocephalus?

Pontofacial Angle Tumors, with Particular Reference to the Involvement of the Acoustic Nerve. Dr. Joseph H. Globus.

(To be published in a subsequent issue of THE LARYNGOSCOPE.)

DISCUSSION.

DR. BYRON STOOKEY: With his usual thoroughness, Dr. Globus has left very little to be said in discussion. There are certain problems which he has presented to you that are very important from a neurological and neurosurgical standpoint. In the first place, the most important step in the recognition of these tumors, as in any neurological disease, is to consider the onset of symptoms. Dr. Globus has rightly said that if this disease process takes its origin from the VIIIth nerve, the early symptoms are referable not to the VIth nerve but to the VIIIth: first, disturbance of hearing, characterized by tinnitus; and, next, disturbance of equilibrium, due to vestibular involvement of the equilibratory mechanism. This is the picture presented by the typical angle tumor. Unfortunately, the typical tumor is rare. Atypical tumors occur that produce neither tinnitus nor vestibular mechanism disturbance until they have

attained great size, so that the diagnosis of angle tumors is fraught with many difficulties—difficulties, first, as to the character of the tumor; and, secondly, as to its location. With an angle tumor that presses upon the cerebellum, cerebellar signs are often dominant.

Not long ago we had at the Neurological Institute a patient with an angle tumor who had no caloric alterations and no changes in the vestibular mechanism; X-rays failed to show any erosion of the petrous ridge; and there was no elevation of total protein in the spinal fluid. Yet these are all things we should expect to find.

I hope that Dr. Northington, who saw this patient, will discuss Dr. Globus' paper because of his intensive study of vestibular cases. Characteristically, of course, these tumors produce disturbances of the vestibular mechanism; and when we have a dead VIIIth nerve and, as Dr. Globus has pointed out, involvement of the Vth nerve, with corneal anesthesia and equilibratory and non-equilibratory disturbances, we may feel pretty certain of a diagnosis.

Among the tumors which may arise in the pontofacial angle are meningeomas and those invasive tumors which Dr. Globus has renamed spongioblastoma instead of glioblastoma, of which he has made a special study. These latter are of a complicated nature and require great skill in diagnosis. I agree with Dr. Globus that they do not give rise to initial symptoms referable to the VIIIth nerve but rather to the adjacent structures.

The initial insult to any nerve structure is the point at which the disease process starts, so that in acoustic neuroma the first symptoms should be referable to the VIIIth nerve. The classical case is easily recognized but, unfortunately, atypical examples occur without papilledema, caloric response, increase of total protein, or erosion of the petrous ridges. It is such cases that offer the greatest difficulty in diagnosis. I shall never forget a case seen with Dr. Friedman at Bellevue Hospital years ago. The wards were long and the floors marked off in black and white squares. Our patient walked the whole length of the ward—his two heels coming right along, side by side; he had no papilledema. I could not see that he had any disturbance of movements; in fact, I could not see that he had anything. In spite of this, I was persuaded to operate, and found the biggest angle tumor I have ever seen.

An important point in connection with these atypical tumors is the rate of growth and the degree of hardness. I should like to ask Dr. Globus to go through his specimens—and there is no one whose pathological opinion I value more—and see what the rate of growth has been and what is the consistency of the tumor. These two factors, I think, are important because with the rapidly growing tumor we certainly have the appearance of papilledema, headache, and other symptoms very much earlier and more constantly than with a slow-growing and insidious growth. Brain and nervous tissue will take a tremendous beating when they have time to accommodate themselves, but with rapid growths they cannot adapt themselves so well. I think the important factors, then, are the character of the growth and the consistency, as well as the size which it attains.

If I may be permitted one minute more, I should like to congratulate Dr. Goldman on his interesting paper on otitic hydrocephalus. I am sorry to see him change the name, but if he is going to do so I should like to see him omit the term hydrocephalus. Meningitic hypertensive irritability is an entity which Dr. Davidoff and others have described, and hypertensive meningeal hydrops is a better name than hydrocephalus. Hydrocephalus somehow implies a dilated ventricular system, and in these cases the ventricular system is extremely small. The relationship of this condition in certain instances to sinus disease is very important. The disease does exist, however, as an entity, and is often seen without any associated sinus disease, in which case the problem is one of obscure brain tumor with practically no localizing signs. When the diagnosis is that of brain tumor without localizing signs, we resort to air studies, and when we find a normal ventricular system we make a diagnosis,

by exclusion, of meningeal hydrops. Decompression is the only operation we have found of value. Repeated lumbar puncture serves no purpose.

DR. PAGE NORTHINGTON: From what we have heard from Dr. Globus and Dr. Stookey, it is clearly understandable that the diagnosis of tumors of the pontofacial angle may be very difficult. From my observations it usually requires a thorough neurological investigation with special tests and X-ray examination before the diagnosis is made. The final responsibility in making the diagnosis from all the assembled data, of course, rests with the neurologist; however, the otologist can render a great service in most of these cases by getting the patients in the care of the neurologists early in the course of the disease. The otologist is usually the first consultant because the first complaint in VIIIth nerve tumors is unilateral deafness, tinnitus and, rarely, some vertigo. If a patient with this complaint shows a unilateral gross loss of cochlear and vestibular reactivity, with a negative history of ear suppuration or trauma to account for the findings, we have sufficient evidence of an VIIIth nerve tumor to warrant a neurological investigation of the patient's condition. When tumors other than acoustic neuroma involve the VIIIth nerve in the pontofacial angle, the history of disturbance of cochlear and vestibular functions is not the earliest symptom, but follows that of adjacent structures in this region. Some patients with brain stem and cerebellar tumors on examination had normal hearing with total loss of vestibular reactivity on one side.

DR. JOSEPH H. GLOBUS: Dr. Stookey was fully informed as to what I planned to say this evening, and we had reached an agreement to disagree on certain points. It was our plan to let our two somewhat different viewpoints remain side by side and let you decide which is the one to accept.

Dr. Stookey stressed the point that there are some true acoustic neuromas which present almost unsurmountable difficulties in diagnosis, while I am inclined to believe that every acoustic neuroma can be recognized and that if not, it is because we do not place sufficient weight on the otological studies and interpretation. In practically every instance of acoustic neuroma, evidence of long-standing impairment of hearing, with or without tinnitus, can be discovered, and if calorice tests are employed, diagnosis comes within reach in practically every instance.

That point, of course, was not my main reason for tonight's discussion. I know that the majority, if not all of you, are familiar with the syndrome of acoustic neuroma, and you are all familiar with the methods of its identification. I was more interested in showing you tumors in the pontofacial region which are not acoustic neuromas—tumors which, unlike the latter, do not offer surgical advantages. I thought that it is highly important to identify this type of tumor as distinguished from the true acoustic neuroma, so that your contribution to the clinical study of a given case may serve as a guide in cases in which surgical interference holds little promise.

I am very thankful to Dr. Stookey for his discussion of my paper, which gave me an opportunity to re-emphasize some points I wished to make.

Localized Nonsuppurative Encephalitis of Otorhinologic Origin. Dr. Miles Atkinson (by invitation).

(To be published in a subsequent issue of THE LARYNGSCOPE.)

DISCUSSION.

DR. E. D. FRIEDMAN: This presentation of Dr. Atkinson's is of extreme clinical importance because every otologist and neurologist is confronted with this problem in the course of his work, and has to make up his mind in a given case whether he is dealing with a focal suppurative lesion or whether this focal lesion of the brain belongs to one of the groups which Dr. Atkinson has described. This condition, as Dr. Atkinson said, is not common. I cannot match his personal experience but I have been able to follow two cases myself

over a rather prolonged period, and, if I may, shall refer to these cases in brief and then perhaps make some concluding remarks.

The first case was a little child, operated upon for mastoiditis one month prior to the time I saw her. A few days before I saw her she woke up dazed, and had convulsions. The involved ear was on the left, the convulsions were on the right. She was aphasic and also showed agraphia. That was seven years ago. Because of signs of a focal lesion in the left temporal lobe, puncture was carried out by the surgeon in an effort to locate a possible abscess. He got some bloody material, and the patient improved promptly after this puncture. The temperature fell and she subsequently made a complete recovery. She came in to see me hardly a week ago, and there were very few residua, except for a very slight facial weakness and seizures suggesting petit mal, probably due to a cortical scar.

The other case, which I reported before our own Section, was that of a laborer, age 40 years, who was admitted to the Otologic Service of Beth Israel Hospital, complaining of pain in the temporal region of four months' duration, following an attack of coryza. He had developed pain in the ear a week prior to admission, complained of transitory diplopia, and at the time of examination showed no focalizing signs. The otologist found a non-suppurative otitis media on the right. The blood count was normal. X-ray examination revealed sclerosing mastoiditis. He was discharged nine days later, with a diagnosis of nonsuppurative otitis media. He was then readmitted, pain and buzzing having persisted in the right ear. Two weeks prior to the last admission, he had noticed drooping of the right upper lid. Neurological examination showed signs of a IIIrd nerve lesion on the right and pyramidal tract signs on the left. There was no papilledema. Lumbar puncture showed clear fluid with 42 cells, 80 per cent of them lymphocytes; total protein, 56—a little above normal. There was a progressive decline in the cells to eight, and finally none at all. (This finding may be of interest to Dr. Atkinson.) Because of the absence of clear signs of brain abscess we took the risk of doing an encephalogram. This showed a shift of the ventricular system to the left, failure of filling of the temporal horn on the right side, and some dilatation of the left ventricle. Owing to the absence of papilledema, we decided to watch this patient further. He was discharged from the hospital in November, 1936. The ptosis disappeared but the buzzing and headache persisted. In January, 1937, he developed papilledema and was readmitted. The signs of IIIrd nerve lesion on the right and pyramidal tract signs on the left pointed to a lesion in the right temporal lobe. Lumbar puncture showed 13 cells. Apparently, in spite of the advance of symptoms, there was no extensive pleocytic response.

On exploration the temporal convolutions were flattened and white. Incision into the middle third of the lobe revealed soft tissue, which was evacuated. The postoperative course was uneventful. The neurological signs subsided and the spinal fluid showed a normal colloidal gold curve and eight cells. The neuropathologist reported the lesion as showing chronic inflammation, mononuclear infiltration, many red blood cells, dilated vessels and swollen capillary walls; no leukocytes and no evidence of neoplasm. Unfortunately, no culture was made of the spinal fluid or of the aspirated material.

Now, the first case would appear to be an example of Dr. Atkinson's hemorrhagic encephalitis, and the second an example of his localized nonsuppurative encephalitis, running a fairly chronic course. Apparently in this case his "association syndrome" was not present, but, of course, the findings in one case do not negate his conclusions which are based on a more extensive series.

In most of the cases reported in the literature the lesions were in the temporal lobe, and our cases were both in the temporal lobe. Oppenheim thought there was no etiologic relationship in these cases between the lesion in the ear and the focus in the temporal lobe. This view is no longer tenable.

It seems to me that the factor which determines the type of lesion in the temporal lobe is the struggle between the host and the invading organism. If

the organism is attenuated and the resistive powers of the host are good there will be no suppuration, but there will be either a mild hemorrhage or localized nonsuppurative encephalitis.

In cases where we suspect brain abscess it is our practice to wait, according to Francis Grant, anywhere up to six weeks, in order to allow some attempt toward capsule formation and walling off of the disease process. These cases, as Dr. Atkinson and all observers in the literature have stated, should be looked for, and while some of them may get well spontaneously—as Dr. Atkinson has said—I cannot speak from my personal experience—I feel that where the process is advancing and the signs are becoming more manifest, even where there is no pleocytosis in the spinal fluid, such cases should be explored.

I think this is a subject which could be discussed at greater length because of tangential points between this condition and so-called otitic hydrocephalus, but the hour is late and I will leave the matter with expressions of appreciation for Dr. Atkinson's valuable contribution.

DR. JAMES G. DWYER: First of all, I wish to convey my compliments to Dr. Atkinson on the presentation of his thesis on such a timely and important subject. Its importance cannot be too strongly stressed.

We have all seen such cases in past years: cases that baffled us; cases in which we operated for abscess of the brain and did not find it; and fortunately in most cases the patients got well. When they got well, we put them down as cases of cerebral intoxication. The work of Dr. Atkinson is a distinct advance in our understanding of the process involved.

The case of mine referred to by Dr. Atkinson in a recent reprint was the most striking of its kind that I have seen in my whole experience. In brief, the history was as follows:

A young girl, age 14 years, was brought to the Manhattan Eye, Ear and Throat Hospital clinic as an ambulance case, as she was in a semicomatose and had been so for four days at home. The history was that for three weeks she had had a discharging ear, became ill, had been staggering around, and finally, as the mother said, became paralyzed and could not walk. Upon examination she showed all the symptoms of an acute mastoiditis complicated by a cerebellar abscess. Nystagmus was present in all directions, vomiting, etc. On account of the patient's mental condition, all the tests could not be made. A diagnosis of acute mastoiditis complicated by a cerebellar abscess was made, and it was decided to do a thorough mastoidectomy and, if any lead was found, to explore the cerebellum. Due to the fact that the whole process from the onset of the acute ear was only three weeks, it was hard to imagine that a walled cerebellar abscess could be formed in this time.

Upon operation a most extensively diseased mastoid was found, with the whole mastoid gutted out in all directions, but the bone over the sinus and middle posterior fossae was found thick and pearly white, and no trace of a direct extension through this pathway could be demonstrated. After consultation with several who were present at the operation, we decided to wait 24 hours and then operate directly on the cerebellum, as recommended by brain surgeons. To our amazement and delight, within 24 hours the clinical picture altered considerably for the better, the child became more co-operative, the nystagmus lessened, and, of course, we decided to wait. To make a long story short, the patient gradually improved, and in due course of time was discharged cured, and has remained well since. Many of the men saw her all through the course of the disease and were equally amazed.

Looking over my records, I can recall some other cases, but nothing so striking as this one. Everybody agreed that it was clinically a typical case of cerebellar abscess, following as a complication of mastoiditis.

I cannot quite follow Dr. Atkinson in his original presentation in the absolute differentiation of these cases. By this I mean that it is quite difficult to differ-

entiate them from true brain abscess. In the case cited above, it was just chance that we did not go ahead and explore the cerebellum — in fact, many of those present at the operation wondered why we did not.

To reiterate, I think this is a very important and timely contribution to otology and one that we will long bear in mind.

DR. MILES ATKINSON: I remember the case that Dr. Dwyer mentioned. It was a very striking case, and it is the only case of the condition in the cerebellum that I have seen. There is one other in the literature that I know of.

I am very grateful to Dr. Friedman, not only for his kind help and criticism on several occasions but also for pointing out to me some of the errors of my ways.

LOS ANGELES SOCIETY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY.

The following list of officers in the Los Angeles Society of Ophthalmology and Otolaryngology for 1941 were appointed:

President: Dr. Harold Mulligan.

Vice-President: Dr. Ben Dysart.

Secretary-Treasurer: Dr. Colby Hall.

Committeeman: Dr. John P. Lordan.

Meetings are held in the Los Angeles County Medical Association building, 1925 Wilshire boulevard, Los Angeles, at 6:00 P.M., fourth Monday of each month, from September to May, inclusive.

AMERICAN OTOLOGICAL SOCIETY, INC.

The Seventy-fourth Annual Meeting of the American Otological Society will take place on May 26 and 27, 1941, at the Marlborough-Blenheim, Atlantic City, under the Presidency of Dr. George M. Coates.

A very interesting program pertinent to our specialty and world affairs today is being planned by our President. The guest of honor of the Society will be Dr. Wells P. Eagleton, for whom 1941 marks the forty-fifth anniversary of his membership in the American Otological Society.

At a later date the management of the Marlborough-Blenheim will send cards to the members of the American Otological Society to facilitate their making reservations at the hotel.

Your attention is directed to the importance of filling out the Biographical Questionnaire which was sent you some time ago. In case this has been misplaced or lost, a duplicate will be sent upon application to the Secretary. It will add much to the value of the record to have your photograph included but do not let the absence of a photograph serve to delay the return of the questionnaire. The records that are being assembled now will be of great historical value in years to come.

